The Builder.

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ILLUSTRATIONS.

Design for the Decoration in Graffito of a Room.—By Mr. C. T. G. Formilli ..... *Double-Page Ink-Photo*
School of Science, Liverpool: Interior of Lecture Hall.—Mr. E. W. Mountford, F.R.I.B.A., Architect ..... *Single-Page Ink-Photo.*
School of Science, Liverpool: View showing Approach to Lecture Hall.—Mr. E. W. Mountford, F.R.I.B.A., Architect ..... *Single-Page Ink-Photo.*
New Wing to Boarding House, Rugby.—Mr. C. A. Nicholson, Architect ..... *Double-Page Ink-Photo.*
New Business Premises, St. Helens.—Mr. Frank S. Biram, Architect ..... *Single-Page Photo-Litho.*
National Press Agency, Carmelite-street, E.C.—Mr. E. T. Hall, F.R.I.B.A., Architect ..... *Single-Page Photo-Litho.*

Blocks in Text.

Geometrical Diagrams of Planning ..... Pages 53, 54, 56
Tripod for a Chafing Pan: Sta. Caterina, Siena ..... Page 57
New Business Premises, St. Helens.—Plan ..... Page 58

CONTENTS.

Peterborough Cathedral 49
Prize Drawings at the Institute 50
The Sewerage of New Building Estates in Rural Districts 50
Notes 51
The Use of Practical Geometry in Designing Buildings 53
Tripod for a Chafing-pan: Siena 57
The Royal Institute of British Architects: Prizes and Studentships for 1896-97 57
Engineering Societies 57
Design for Decoration of a Room in Graffito 58
Interiors, New Technical School, Liverpool 58
New Wing to Boarding-House, Rugby 58
New Business Premises, St. Helens 58
National Press Agency 58
Tests of Steel and Concrete Floors 58
Peterborough Cathedral 59
Competitions 59
Architectural Societies 60
The Surveyors' Institution 60
Books: D. G. Hogarth's "Wandering Scholar in the Levant;" "Theatre Panics and their Cure"; F. A. Crallan's "Gothic Wood-carving" 60
Copper Roofs 61
Student's Column: Specifications.—III. 61
Obituary 62
General Building News 62
Sanitary and Engineering News 63
Electric Lighting News 63
Stained Glass and Decoration 63
Foreign 63
Miscellaneous 64
Capital and Labour 65
Legal 65
Meetings 66
Recent Patents 66
Tenders 67

Peterborough Cathedral.

THE latest phase in the futile agitation of the Society of Antiquaries and their henchmen the Society for the Protection of Ancient Buildings against the action of the Dean and Chapter in respect of the west front of Peterborough Cathedral is really colossal in its impertinence. The Dean and Chapter have taken the advice of Mr. Pearson and Sir Arthur Blomfield, who, it is not too much to say, have had a more extensive experience in church building and restoration than any other architects now living. Acting on the advice of these counsellors, they employ Mr. John Thompson, the builder, who has had a larger experience in dealing with dilapidated cathedrals than any other in England, to carry out the work the experienced architects recommend. Then a Committee of the S.P.A.B., the Secretary and four others, produce a so-called "preliminary specification," and a number of other architects, who "have not examined the west front of Peterborough Cathedral from the scaffolding," express their approval of this specification, which professes to teach the Dean and Chapter a better way than that proposed by Mr. Pearson and Sir Arthur Blomfield.

Part of this specification, with the names of the architects approving it, will be found in another column, and a considerable portion of it has appeared in the *Times*, and the British public may be supposed to imagine that the Dean and Chapter are doing something very wrong and foolish.

When the practising architects of Great Britain look through the names of those who thus question the judgment of experienced advisers, the great majority will wonder who some, at least, of these "architects" are, and what they have done or learnt, that they should speak so loudly and confidently. Those who do recognise the names of these signatories will know at once that youth and inexperience are their best qualifications for dealing with the west front of Peterborough Cathedral; that the majority were babes unborn when Mr. Pearson and Sir Arthur Blomfield were architects of experience in church building and restoration; that the whole of the nineteen signatories between them have not carried out a tithe of the church work that either Mr. Pearson or Sir Arthur Blomfield has done,* and we doubt very much if Mr. John Thompson, with his experience of the construction of Peterborough Cathedral, would care to risk his reputation or the lives of his workmen in carrying out the scheme propounded under the official hand and seal of the Society of Antiquaries.

The fetish of the S.P.A.B. is non-disturbance of the visible work, the panacea of their committee is underpinning. They would first underpin the foundations of the piers and the porch, then work upwards, still underpinning, although above ground. They would tunnel into the piers from behind, putting in a new core to the old facing, underpinning to the defective work above, gradually reaching the spandrels of the arches, tunnelling into these also from the back, working upwards, and underpinning again the defective work above, and so on to the top.

This sort of suggestion is good enough for the Society of Antiquaries and the general public, but readers of the *Builder* scarcely need telling what these cocksure critics seem to forget, if they, indeed, have ever learnt, that you cannot underpin unless you have sound work above to pin up to, sufficiently sound to stand whilst the new work underneath is being brought up to support it. The authors of the specification admit that the substance of the walling must, "to a greater or less extent, be in a state of disintegration," and "that careful and persistent watching of the building when applying the supporting constructions would be very necessary, so that every sign of possible weakness might be met from time to time as the different works were being carried out." These gentlemen also rightly enough insist as a prime necessity for their method upon an elaborate and "effectually contrived" system of shoring, strutting, cradling, and centering, so that "the narthex would be securely sustained from the ground upwards, and in the direction towards the west wall of the church." The specification itself, indeed, contradicts the report of the representatives of the S.P.A.B. that it was "obvious to any practical man that the Society's recommendations could be carried out in their entirety with ease and safety," and in fact the description in their specification of the proposed methods of burrowing into disintegrated stone-work and pockets of vaulting, with the elaborate provisions which even they must perceive to be necessary at every step to prevent the building coming down on the workmen—all this to prevent the crime of taking off the facing stones and numbering and replacing them, reads to us, we must frankly say, like the lucubrations of people who are hardly in their right minds; unless the truth is that they really never expected their advice to be taken at all, and that all this extraordinary description is only something intended to influence the minds of the uninstructed public. At all events, it is probably well for the signatories that they are not allowed to try the experiment, for we believe the result would be that either they or the Dean and Chapter (according to the view the law took of responsibility in the matter) would be exceedingly likely to find themselves placed on their trial for manslaughter.

The Committee of the S.P.A.B. "were much interested in the varied curves of the ribs resulting from the slow strain put upon them by the settlement of the piers." They wish, in short, to retain all the accidental effects of time, weather, bad construction and failure, and the President and Secretary of the Society of Antiquaries affix their signature to the statement that the method proposed "is also better for the subscribers to the Restoration Fund as being obviously less costly than rebuilding." We appeal to "any practical man" amongst our readers as to whether it is even remotely possible that the elaborately constructed timber supports and the replacing of the defective core of the walling by small tunnels, each timbered and strutted in turn, would be "less costly than rebuilding."

The method of working by tunnel might be possible if the core were in fairly good condition; but in all seriousness we ask who are the best judges of this: Mr. Pearson and Mr. Thompson, who have found out by

* It may be added that there is an obvious amount of partisan spirit in the matter which the public, who know nothing about architectural parties or politics, do not of course perceive. With the exception of Mr. J. J. Stevenson, the whole of the architects signing the document are of the party who refuse to belong to the Institute of Architects or to have any dealings with it. That is no crime; only the fact shows that this agitation proceeds from a clique.

past experience what the internal construction of the walling at Peterborough is like, or the irresponsible and comparatively inexperienced architects who by their own confession have not been able to make a sufficiently close inspection of the wall, even from the outside, to render their specification complete.

One consideration is very strongly impressed upon one in connexion with the subject, viz: that the preservation from ruin of our great mediæval buildings ought to be regarded as a matter of national concern, on which public money should be expended. The custodians of our cathedrals in almost all cases are without the funds to make even necessary repairs to the structures for the safety of which they are responsible. There is Salisbury spire evidently in considerable danger; there is no question here of taking down or rebuilding, but only of making it safe, but evidently it is doubtful whether or when funds can be collected from private sources for such a purpose; and the collapse of Salisbury spire would be a national loss. The architects of Leicester, the largest town in the Peterborough Diocese, have, as mentioned in another column, subscribed somewhat over 70*l.* towards the Peterborough repairing fund, partly as a practical testimony of their reliance on Mr. Pearson; but how far can such sums go towards doing the necessary work? It is a matter of national interest, and should be taken up by the nation at large.

PRIZE DRAWINGS AT THE INSTITUTE.

THE always interesting exhibition of drawings submitted for the various Institute prizes is this year hung in rather cramped spaces in the council chamber and meeting room. The officials have done better than could have been expected under the circumstances, but the result is less satisfactory than in the old days when the large galleries were available.

The designs of the Soane medallion, Tite prize, and Grissell medal are in the lower room; the first-named, for which thirteen designs were submitted, occupying by far the largest part of the room. The subject set for the Soane competition was "A Provincial Market Hall," and the plans naturally bear a strong family resemblance to one another—an open space on the ground level, generally vaulted, with a large meeting room above, one or two staircases, and retiring rooms on both levels appear in all cases, usually somewhat similarly arranged in the manner that naturally suggests itself. This being the case, the interest centres chiefly on the architectural treatment of the building; and this varies over a wide field, the most marked feature of which is the almost entire absence of the "very latest, entirely original" manner, which has appeared in several students' exhibitions lately.

Mr. J. A. R. Inglis, who is the successful competitor, has chosen a "Palladian" style, skilfully modified, and treated with restraint and good taste externally; inside he seems to have succumbed to the danger, which any one using the style must run, of being rather uninteresting and commonplace. His draughtsmanship is excellent, especially in the neat and effective perspective, and he has certainly well earned his success. It is less easy to understand why any lesser awards were given. Mr. J. A. Swan receives a medal of merit, and Mr. C. H. Holden honourable mention; but their designs, though certainly good, hardly seem to us to rise so much above the level of some others as to merit especial distinction. The chief points in Mr. Swan's work are excellence of draughtsmanship in the elevations and details, a rather weak water-colour perspective, and minute attention to heating and ventilation. Mr. Holden takes a unique view of the requirements, and gives a direct entrance to the upper hall and no connexion between the two: his perspective is drawn as if it were to be cut on wood, but has a certain effectiveness. Among the other designs the most striking is one under the device of a scallop shell. It looks as if imported from the Netherlands, and has a great slated or shingled turret which, however, is very inadequately supported. One other, "'Neath Southern Skies,' deserves notice as an unsuccessful attempt to imitate the style of a certain prominent architect: it is a very gorgeous production but might please some persons' taste.

The subject for the Tite prize was the fascinating one of an Italian Villa and Garden, but it has attracted only two competitors, one of whom has designed a large country house which, moreover, is more English than Italian. The other competitor has well grasped the general idea, but failed to produce a satisfactory design, especially as regards the garden, to say nothing of the draughtmanship, which is very poor. The prize is not awarded.

"A bay of a church, vaulted in stone throughout" has produced what we think is the best competition design for the Grissell gold medal since it was first offered. There is no doubt that Mr. S. K. Greenslade, the successful candidate, has well earned the honour by his charming design, and his neat pencil drawing. There is, however, one other competitor who has succeeded in being exceptionally interesting. He has constructed his arches and vaults on strictly scientific lines, using catenary curves, and has produced something which is by no means very ugly, and seems to us to show that, in the hands of the right man, such forms would not be incompatible with very beautiful results.

The competition for the Pugin studentship is better than it has been for many years. It has been awarded to a beautifully executed set of very thorough and workmanlike pencil studies by Mr. Wm. Haywood, among which the drawing of the pulpit in St. Chad's, Birmingham, is conspicuous for the effective use of pure outline and for patient labour. He has not been afraid to deal with the richest and most complicated work, nor has he neglected what is simple and useful. His drawings are all to measurement, except two illustrative perspective sketches and some studies of carving. Mr. C. De Gruchy receives a medal of merit for a mixed collection of measured drawings and sketches, most of them useful and interesting and all very well drawn: the pretty pictures got up for show being in a minority. He has used ink as well as pencil, and in some works a little wash. His *pièce de résistance* is the Chantry of Abbot Ramryge at St. Albans. A medal of merit is also awarded to Mr. J. A. Swan, who has again taken the rather unusual course of submitting drawings of foreign work only. We suppose this is admissible, but it does not seem to be quite what one would suppose, from its name, to be the intention of the prize. The excellence of some of Mr. Swan's work is, however, unquestionable. He has added to the drawing of the "Skipper's House," Ghent, which appeared last year, an equally effective—perhaps more effective—one of the Meat Market, Ypres, in the same style; and another, which we think is also new, of a "pew" in Notre Dame, Bruges. But he continues to rely partly on some rather useless large pencil perspectives. To Mr. W. E. Dobson honourable mention is accorded for some careful and fairly skilful studies and sketches which seem to be the promising work of a youngish man.

We do not think that either of the two sets of drawings submitted for the Owen-Jones Studentship are quite equal to the best work sent in in former years; but there is much that is excellent and interesting in that of Mr. A. E. Henderson to whom the Studentship is given, and Mr. A. T. Griffith, who is awarded the Aldwinckle Studentship, has been very industrious, and has spread his studies over a very wide field. Mr. Henderson has given his chief attention to the early Italian and Sicilian, so-called Byzantine, churches; St. Mark's, Monreale, &c.; Roman mosaics, and pre-Raphaelite frescoes. He would, perhaps, have learnt more by making a few more diagrams of colour schemes, instead of some of the water-colour sketches. Mr. Griffith's best drawing is a water-colour sketch of a church tower and other buildings at Colwall. The drawings by Mr. Corlette, last year's Owen-Jones student, are most interesting. They consist of fairly complete studies of a church—St. Savin—near Poictiers, of late Romanesque type, with the original barrel vaults and colour decorations still existing, and four carefully finished drawings of the coloured statues at Albi.

Three candidates have chosen St. Mary-le-Strand Church as their subject for the silver medal competition, and one, Mr. F. J. Wass, Melrose Abbey. We think, on the whole, that justice has been done in giving the medal to Mr. Wass; but none of the sets of drawings are really altogether good, and in neatness and finish the competitor signing himself "St. Mary" is nearer to the usual standard than the winner. It would, we fancy, have done no great harm to withhold this prize.

Some drawings by Mr. Crouch, the Tite prizeman last year, and several sets of the "testimonies of study," submitted by candidates for examination, are hung with the competition works.

As a whole, we think the Institute competitions must be considered a distinct success this year. Those for the Pugin studentship and Grissell medal are quite exceptionally good, and that for the Soane medallion is above the average. The other work submitted is perhaps a little below the highest standard reached before, but the only real failure is in the Tite prize competition.

THE SEWERAGE OF NEW BUILDING ESTATES IN RURAL DISTRICTS.

IT is a matter of common knowledge that building estates are being constantly laid out all round the coast of the United Kingdom. Places which in one year are comparatively barren agricultural land are

next year seen to have become covered with houses. It is for this reason that a case recently decided by the Lord Chief Justice of England and Mr. Justice Wills deserves something more than mere cursory notice. For it appears to lay down a rule of conduct both to proprietors of estates who are developing them and to the Local Authorities within whose jurisdiction they lie. The decision to which we refer is that of the Queen *v.* The Tynemouth Rural District Council which will be found reported at length in the Law Reports for 1869 (Q.B. Vol. II. p. 219). Probably the most satisfactory course for any one interested in the question would be to read this report *in extenso*, but for the benefit of those who are not able to do so, we may point out the salient features of the case.

In 1894 Lord Hastings proposed to lay out an estate at Seaton Delaval, in Northumberland. He therefore deposited with the Rural District Council plans which showed the new street which he intended to lay out, and also other plans which showed some of the new houses proposed to be built in a new street called Avenue-road. To these latter plans the following note was appended:—"It is proposed that the street and outfall sewers should be made by the Rural District Council and not by the landowner." The Council approved the street plans, but refused to approve the house plans, upon the following grounds, which were also appended to the plans:—"Disapproved of until it is shown into what sewer or other means of drainage the house drains are to communicate and empty, and for want of a proper and sufficient mode of drainage and sewerage. The Council object to the proposal that they should make the street and outfall sewers except under agreement with, and at the expense of, the landowner or the depositor of these plans. Otherwise than this, the Council require the same to be made by such landowner or depositor." There was thus a direct conflict between the landowner and the Sanitary Authority, one which, it is obvious, might occur any day in any part of England where extensive building work is about to be carried on. The question was next brought into the law courts on an application by Lord Hastings for a mandamus to compel the Council to approve his plans—so that the Court had to lay down a rule which would obviously affect, not only this dispute, but future and similar cases. The practical question may be stated in the words of the Lord Chief Justice: "Can a Local Authority, who have no objection to the plans of the buildings as such, decline to approve of a building owner's mode of laying out his property unless that building owner undertakes to have a system of sewage carried out at his own expense, including an outfall sewer?" The answer to this question obviously depends on the authority and power given to Sanitary Authorities by the Public Health Act. Under section 277 of the Public Health Act, 1875, a *rural* Local Authority can obtain from the Local Government Board an order constituting the area proposed to be built on, or any proper modification of it, a special drainage area, in which case the whole of the cost of the new drainage will be thrown upon the area. On the other hand, the new area will then be exempt from the drainage rates of the district generally. But if a rural Sanitary Authority wishes to keep the building owner as a contributor in respect of the area in question, to the rest of the drainage, then the proper course would be to apply to the Local Government Board to give them urban powers in respect of new street and when the authority was invested with such power, it would be able to proceed under Section 150 of the Public Health Act. That section empowers an Urban Sanitary Authority to give notice to owner or owners of a new street to sewer, pave, or metal it at his or their expense. The street can then be taken over by the Public Authority. The action of the Tynemouth Rural District Council was therefore illegal. They were disapproving of Lord Hasting's plans on untenable grounds. The proper course was to approve of them and set to work to take the necessary legal steps to enable the Council to see that the work consequent upon them, namely the construction of sewers was undertaken at the proper time under one of the two systems which we have mentioned. As the Lord Chief Justice remarked, if only a few houses under the building scheme were erected "it might be perfectly possible to deal with the sewage of that limited number of houses by means which need not necessitate or require any expensive scheme of sewage." In other words, the Local Authority might adopt some temporary expedient. On the other hand, it is the postponement of extensive sanitary operations which has over and over again landed Sanitary Authorities in difficulties. As soon as a building scheme is proposed, which, on paper, at any rate, requires sewers to be made, it is clearly the right policy to proceed to get the necessary plans drawn out. If the building scheme halts in its execution, the authority may well wait to see that it is really executed before going to any expense in the matter. One thing, however, is quite clear from the decision in this case, that a Rural Sanitary Authority cannot proceed as did the Tynemouth Council: they must approve the land owner's plans for the buildings if they are in accordance with the prevailing by-laws, and then make up their minds which of the two courses open to them they will follow, and, having taken this decision, they should inform the building owner of the work which he will have to do.

On the other hand, the building owner should be on his part aware of the proper course of procedure. The somewhat offhanded note appended in the present instance by him to the plans was provocative of disapproval of the terms on which the plans seem to be put forward. In fact, the present case is illustrative of the way how this kind of matter should not be managed for both building owner and Local Authority appears to have acted in a somewhat heedless manner, resulting, it is true, in a useful decision and in some grist for the legal mill.

NOTES.

Architectural Accounts at Delphi. M. BOURGUET, of the French School at Athens, publishes, in the current number of the *Bulletin* (1896 I-X., p. 197), two important inscriptions from Delphi, dealing with the accounts of the temple officials for building and restorations. They are of considerable interest to all students of ancient architecture, as throwing light on the meaning of certain technical terms, and giving many interesting details as to price of work and salaries of officials. Both inscriptions were found to the north-east of the treasury of the Athenians, near the Sacred Way; they are engraved on large slabs of bluish calcareous limestone, and in all amount to over 200 lines. Their date is fourth century B.C. They are evidently meant to be read consecutively, and are a statement of the sums given by the Council of Delphi to a commission of *ναοποιοί* for payment of expenses incurred in the sanctuary. For details, which are given with extreme minuteness, we must refer our readers to M. Bourguet's commentary. We may note that an architect, Xenodoros, gets for six months' salary 360 drachmas, which cannot be regarded as excessive. The existence of the *ναοποιοί* was, of course, known before; but little had been made out with certainty before as to either their constitution or functions.

International Art Exhibition at Dresden. WE have received particulars of the International Art Exhibition, which will be held this year at Dresden on the occasion of the twenty-fifth anniversary of the reign of King Albert of Saxony. Perhaps the most noteworthy feature of this Exhibition will be that the number of works to be shown will be limited to one thousand, which is, of course, a comparatively small number for an Exhibition of this description. The Dresden Exhibition buildings will be arranged for the purposes of the collection under the supervision of Baurath Wallot, who has 10,000*l.* at his disposal for alterations and decorations. Particular care will be taken in respect to the hanging of oil-paintings, and a number of preliminary experiments have already been made with this view. The great success of former art exhibitions at Dresden would seem to promise success for this one. Full particulars can be obtained from the offices of the "Internationale Kunst Austellung," at Dresden, and it is to be hoped that English artists, not omitting architects, will be well represented.

The Marienburg Castle. FROM time to time we have referred to the progress made in the restoration of the Marienburg Castle, which was the subject of a lecture at the Architectural Association last year. From official reports we understand that no less than 115,000*l.* are still necessary to complete the work, and that it has been decided to raise the funds by a State Lottery. According to the amount of work being done under the present estimates and contracts, quite 100,000*l.* is being expended at present, for which the necessary funds are forthcoming, as no less than 50,000*l.* were in the hands of the Society, which is undertaking the alterations, and there was nearly 50,000*l.* promised. It is interesting to observe to what an extent contributions have been raised for the completion of what may be termed "A National Restoration" of one of the great landmarks in the history of Prussia.

Excavations on the Academy Road at Athens. WE drew attention recently to the discovery of the ancient road to the Academy at Athens. We are glad to learn that this has been speedily followed up by the identification of a precinct of Artemis, which Pausanias notes on his way to the Academy

(I., 29, 2). All that he says is that there was an enclosed precinct (*περίβολος*), with xoana of Ariste and of Kalliste, of the Best and the most Beautiful; these titles, he adds, are, in his opinion—confirmed by the poems of Sappho—epithets of Artemis. Exactly what traces of the *περίβολος* have come to light is not yet reported, but inscriptions have been found relating to the priest of Artemis. Long ago, near to the Dipylon, was found a small square altar of Pentelic marble, bearing in letters of Macedonian date the inscription, "Mitrobates dedicated (it) to Artemis;" also a stele built into a wall near the Dipylon, bearing a long inscription (*circ.* 262 B.C.) dealing with a thiasos. This stele it was directed should be set up in the sanctuary of Artemis. Immediately after the peribolos of Artemis, Pausanias noted "a temple of no great size, to which the image of Dionysos is conducted every year on appointed days." This we hope may be discovered, and who knows but that the monuments of Solon, of Perikles, of Thrasybulus, of Phormio may come to light.

Electric Traction.

WE have received from the British Electric Traction Company a pamphlet describing, in a popular manner, various methods of tramway working. The overhead trolly system is treated at greatest length, and quotations from the reports of deputations appointed by the Glasgow Corporation and the City Council of Belfast to inspect the tramways of the United Kingdom and the Continent are given to show what an excellent thing the trolly wire really is. The Glasgow deputation, after a further lengthened tour in the United States, say, "We are perfectly reconciled to it, and feel that it only wants to be seen to be appreciated." It is odd that so many Corporations send deputations all over the world instead of having a consulting engineer. There are many excellent books on electric traction published, and quotations from these would be far more interesting and instructive than badly-worded Corporation reports. The British Traction Company say that they possess the British patents for the only practicable surface contact system. This is a mysterious statement, as we know several practicable surface contact systems. There is the Westinghouse system, which Dr. Hopkinson has recommended for some streets in Leeds, and there is the Claret-Vuilleumier system, adopted in Paris by the tramway between the Place de la République and the suburb of Romainville, which was opened last June. Both these methods are excellent and practicable.

Trustees and Sanitary Improvements.

A DECISION of Mr. Justice Stirling is reported in the current number of the Law Reports which, though turning on a strictly legal point, is one of much practical importance. A Sanitary Authority gave notice to the occupier of a leasehold house, under the Public Health (London) Act, 1891, to do certain sanitary work. He also gave a similar order to the agent who collected the rent of the house on behalf of the owners. These owners were trustees, who, of course, handed over the net proceeds of the rent to certain beneficiaries. The work in question was done, and cost 122*l.* odd. Then the question arose whether the sum was to be paid out of the rent or out of the capital; that is to say, was the money to come out of the pocket of the tenant for life or out of that of the remainder-man. In the opinion of the judge these works, drainage repairs and alterations, disconnecting sinks from drains, and supplying new traps and pipes in place of old and defective ones, were not "ordinary repairs," and therefore should come out of the capital or "corpus." We have nothing here to do with what may be called the financial policy of the management of estates, and as to whether it is good or bad management to come upon the capital for such work as here mentioned. But there can be no doubt that when such work may be charged by trustees against capital, there is often a larger fund available, so that the work may be done more efficiently, and thus the sanitary condition of house property is likely to be better in consequence of this decision. Nor, again, are we criticising the judge's definition of ordinary and extraordinary repairs, though it must be confessed that, as traps and other sanitary articles wear out, it is doubtful if the phrase "ordinary repairs" was not looked at in rather a narrow spirit.

A Patent Museum.

THE President of the Society of Patent Agents recently suggested the establishing of a Museum of Patents at the Patent Office. Bacon said that he took all knowledge for his province, and patents are connected with every form of mechanism. It is difficult, therefore, to see how any Museum of Patents can be really complete. Where is it to begin and end? How is it to be limited so as to be brought within reasonable proportions? What are required appear to be rather museums of various branches of applied mechanism, in which patents applicable to such mechanisms can be studied, both historically and practically. It is said that without a Patent Museum ingenious persons are misled. Sometimes they proceed to take out patents for what are not new inventions; sometimes they fail to take them out under the erroneous impression that they have already been patented. One can hardly see how a necessarily limited Patent Museum can be of real service in many of these instances, since it is obvious that in it can only be contained what may be termed cardinal or guiding patents, whilst the ingenious inventor is in doubt over some subsidiary piece of mechanism which cannot be exhibited except in a museum strictly confined to one subject.

The Priory, Birkenhead.

IT is proposed to raise a fund for acquiring the ruins of the Priory, at Birkenhead, and conveying them to the Corporation in trust for the burgesses. Hamon de Massey, third baron of Dunham Massey, founded the priory, dedicated to SS. Mary and James, for sixteen Benedictine monks, in the twelfth century; in 1282 a charter was obtained for ferry-rights across the Mersey. The rights of ferry at Birkenhead formed a cause of litigation that extended over a long period, beginning with a suit against the prior in 27 Edward III. in respect of the Monks' Ferry, and the controversy was not determined until about fifty years ago, when the Ferry was bought by the Town Commissioners. Leland says the priory was subordinate to St. Werburgh's Abbey, Chester; Tanner considers it was independent. The priors sat in the Parliaments of the Earls of Chester, enjoying the rights and dignities of barons of the County Palatine; the revenues were valued at the suppression as worth 102*l.* 16s. 10d. yearly, *teste* Speed. The priory, garrisoned by the Royalists, was captured in 1644 by the Parliamentarians. The ruins comprise a portion of the refectory, whereof the principal entrance has been described by Rickman and other writers for the variety and beauty of its mouldings. As at Chester, the church stands south of the quadrangle: there are a plan and two views (after G. Pickering) in Ormerod's "Cheshire."

Burlington Fine Arts Club.

THE loan exhibition of the water-colour drawings of the late Mr. Alfred Hunt forms one of the most beautiful collections of artistic work which has ever been seen in that well-known room. Once again we see illustrated the remarkable variety of Mr. Hunt's landscapes, in which there is no trace of mannerism or trick of style, but which seem almost as various as the varied aspects of nature herself. The two main objects which Mr. Hunt seems to have placed before him were to study nature faithfully and unremittingly, and, in reproducing her effects on paper, to endeavour to escape as much as possible from the mere materialism of pigments. This latter end he achieved to a wonderful extent in many of his works, which seem more like small aërial visions of landscape than collections of brush touches on paper; though he could be vigorous enough in touch, too, when the style of subject suited it. Among those which convey most completely the feeling of the scene while concealing the mechanism of execution is that of the "Stiff North-Easter" (40) in Robin Hood's Bay; also the "Wind of the Eastern Sea" (68). Compare with these the solidity of "Schloss Elz" (72); the exquisite gradation of light and tone in "Climbing Shadows" (62), the grand contrast of the dark and light hills in "Ben Sleoch and Craig Roy" (91); the wonderful rainbow light in No. 102; the fine architectural effect in the drawings of Durham. But one might go on to mention every drawing in the room; there is not one that has not its special beauty.

Mr. Pearson and the Peterborough Dispute.

WE understand that there is a movement on foot on the part of some of the leading architects in London and elsewhere to make some kind of formal testimony of their respect for and confidence in Mr. Pearson, in view of the fact that he has been, as they consider, the object of a most violent and uncalled for attack.

ARCHITECTURAL ASSOCIATION OF IRELAND.—We have received the printed book of the Constitution, By-laws, and Syllabus of Meetings of this Association. The following is the list of papers already promised: "Hospitals and Hospital Construction," by Mr. F. Batchelor; "Mediæval Embroidery and Ancient Vestments," by Mr. M. J. C. Buckley; "Electric Lighting of Buildings," by Mr. J. W. Boucher; "Early Irish Art and Contemporary Work on the Continent," by Mr. W. G. Doolin; "Some Old Buildings in Antrim and Down," by Mr. W. J. Fennell; "Method of Shoring Buildings by Iron Frames," by Mr. C. Geoghegan; "Artificial Heating of Buildings," by Mr. W. R. Maguire; "Drainage and Sanitary Construction," by Mr. W. Kaye Parry; "Open Roofs," by Mr. Pentland Howard. The actual dates at which each of these papers will be read are apparently not fixed yet, though the dates of ordinary meetings (on alternate Tuesdays) are arranged.

Fig. 1.

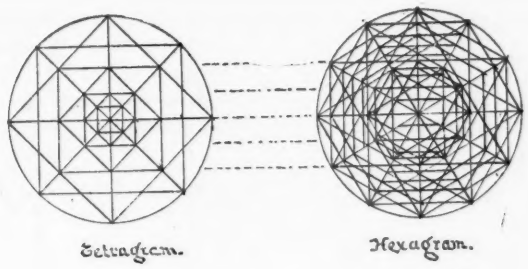


Fig. 2.

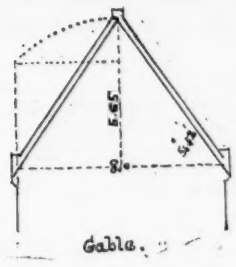


Fig. 6.

Fig. 3.

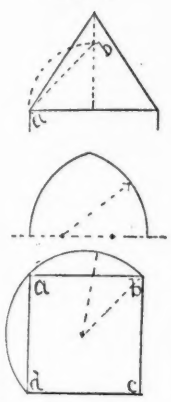


Fig. 4.

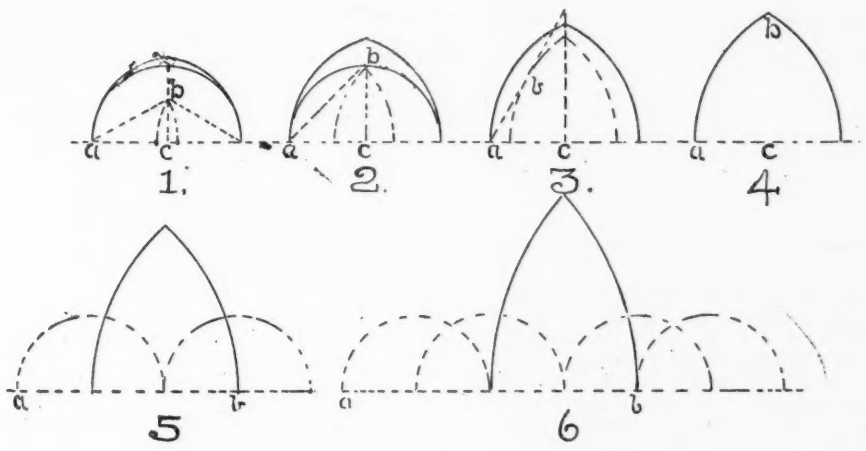


Fig. 5.

THE USE OF PRACTICAL GEOMETRY IN DESIGNING BUILDINGS.

By W. R. Corson, Architect.

In 1846 R. D. Chantrell, of Leeds, architect, read a paper to the Royal Institute of Architects upon proportioning churches by means of a geometric system. This system had been suggested to him by finding, on the bed of a stone that had been a portion of a mediæval building, a diagram of interlaced equilateral triangles. The figure, which is called by Freemasons the Royal Arch, is the root of the diagram (fig. 1).

About the same time a paper by Professor Cockerell, read before the Archæological Institute, was published in their Transactions, 1845. It was upon proportions geometrical, illustrated by Winchester Cathedral.

Some time before this Mr. Kerrick, in "Archæologia," vol. 19, 1821, propounded a theory, based upon the use of the pointed oval, called *vesica piscis* (a hallucination).

Mr. Pettitt Griffith, of London, architect, published several thin quarto books, applying geometry to Classic and Gothic buildings, but his methods were fluctuating and uncertain, and led to nothing.

A book by Matthias Roriczer, 1486, was republished in Germany, and partly reproduced in "Archæologia," 1846. It shows the use of intersecting squares in designing pinnacles.

Cæsar Cæsarianus (early sixteenth century) gives a plan and a section of Milan Cathedral; the former designed by using squares, and the latter by equilateral triangles.

It was in consequence of reading Chantrell's paper that I sought out these and other books, and that in 1847-8-9 I made a study of diagrams founded on the square and the triangle equilateral, and the pentagon, with the result that I began the use of the hexagram—the Royal Arch being the basis—in planning, and in designing all parts of a building—elevations, sections, and mouldings. In planning, however, I have in later years found the square and its diagram to have been most certainly used by Mediæval architects, and to be very valuable. It was probably used by Egyptian and Greek architects, and surely by the Moors, but I have not followed out an investigation in these styles to any extent. The Temple at Jerusalem was planned on squares, and five cubits was the dimension of the initial square. On linear paper the entire plan of the buildings, which cover, including courts, about eight acres, may be drawn without using a scale.

When four intersecting triangles are drawn, they form a dodecagon in the centre of exactly one half the diameter of that which may be inscribed about the four triangles; within that space therefore may be drawn again the diagram of four triangles to half the scale, and outside may be drawn the diagram to twice the scale, thereby giving a series of equal divisions, and making it possible to repeat on a larger or smaller scale any figure that may be drawn within the diagram, by using the corresponding lines outside or inside the original figure.

Intersecting squares repeat in the same manner, and in the same ratio.

For many years I used only the hexagram in planning, but latterly I have sometimes used the tetragram, or, rather, the square (fig. 2). For the elevations and sections, instead of a network of triangles, as shown on Milan Cathedral, I used the hexagram, basing the initial circle on the floor line. It has advantages over the former, which gives simply equal divisions, vertical and lateral. This gives in addition others not equal, but yet always proportional. It also gives lines that are full of suggestion: this, indeed, is a grand feature of the system as used in elevation, or in section, or in mouldings. It also, I think, tends to compress dimension, to avoid bulkiness, and yet to give the *effect* of greater dimension than the real. For mouldings it is invaluable, no matter what the style.

I am satisfied from recent investigations that the Mediæval architects used the diagram in designing sections and elevations, and not the web of triangles as shown by Cæsar Cæsarianus. I had often tested the latter method on drawings of old churches, but it was never satisfactory. Viollet le Duc favoured it, but neither was his application of it satisfactory. Here and there were coincidences of lines, and that was all. I tested also the "diagram" on drawings, but the difficulty I felt was to find and use the initial dimensions: it had not occurred to me, I think, to take the dimension of one bay, although, strange to say, after I had begun to use the diagram in my own work, that was what I myself did in designing street buildings and churches—any building which naturally is divided into bays or severies, or, as the French say, *travées*. Since I began to write these memoranda, however, I have tested drawings on this basis, and am now satisfied that it was what the old architects did. Next, it will be asked, "How did they arrive at the bay?" It has been to me a puzzle to determine the initial work of men long since dead, and whose modes of thought we are ignorant of, but at present my idea is that circles were first drawn—two, three, or four it may be—in a line, each of them divided into four by the leading lines of the diagram, and each of these divisions became a bay, which then became the subject of design by squares, defining the pillars and their size, the walls and buttresses. Beginning at the west end, and marking off the number of bays according to the intention, there is generally, in the case of a transept church, a break, and the dividing of the eastern portion is sometimes difficult to trace. Very often the bays are slightly less in width than those in the nave, but we do not know what was in the mind of the designer, and cannot follow his footsteps. In doing these things it was not necessary or imperative to work to a scale and to definite dimensions; the whole plan might be drawn and the dimensions determined afterwards. It was usual to begin to build a large church at the east end, and work towards the west; but the plan, when it was being designed was—to my mind—begun at the west end, the entrance.

There is one proportion which in pointed architecture seems to have been adopted invariably, or almost so, in all churches having aisles. An equilateral triangle, which has the floor in cross section for its base, defines by its apex the height of the nave. It is this rule which gives the great height to the Cathedrals on the continent of Europe, that is, of those which have double aisles, the base of the triangle being thereby extended nearly a half, and the height nearly a quarter. Sir C. Wren adopted this proportion in the nave of St. Paul's. In the case of churches without aisles, like the Saint Chapelle at Paris, that at St. Germain, and that at Rheims, the line of the floor is continued as though there were aisles, and the proportion of height determined in the same way. (In the E. P. Church, Withington, the ceiling of the nave is determined in height in this manner, and so also that of the billiard room at Broadoak, Withington.)

When planning a house there is usually, to begin with, a definite idea of the size of the principal rooms; say that it is 24 ft. by 16 ft., or 27 ft. by 18 ft., I would take 16 ft. or 18 ft. as my normal dimension, draw the diagram with that dimension, and extend it for the length. Sometimes I have taken the length instead of the width, but whichever it may be, upon a diagram of that dimension all the drawings are worked; plans, sections, elevations, enlarged portions, and details; full size these last generally. To do this with ease it is necessary to choose a series of scales, such that being multiplied by two continually will end in full sizes. This led me to use the series which does so, $\frac{3}{16}$ in., $\frac{3}{8}$ in., $\frac{3}{4}$ in., $1\frac{1}{2}$ in., 3 in., 6 in., and 12 in., or full size. The first for sketch designs, the second for working

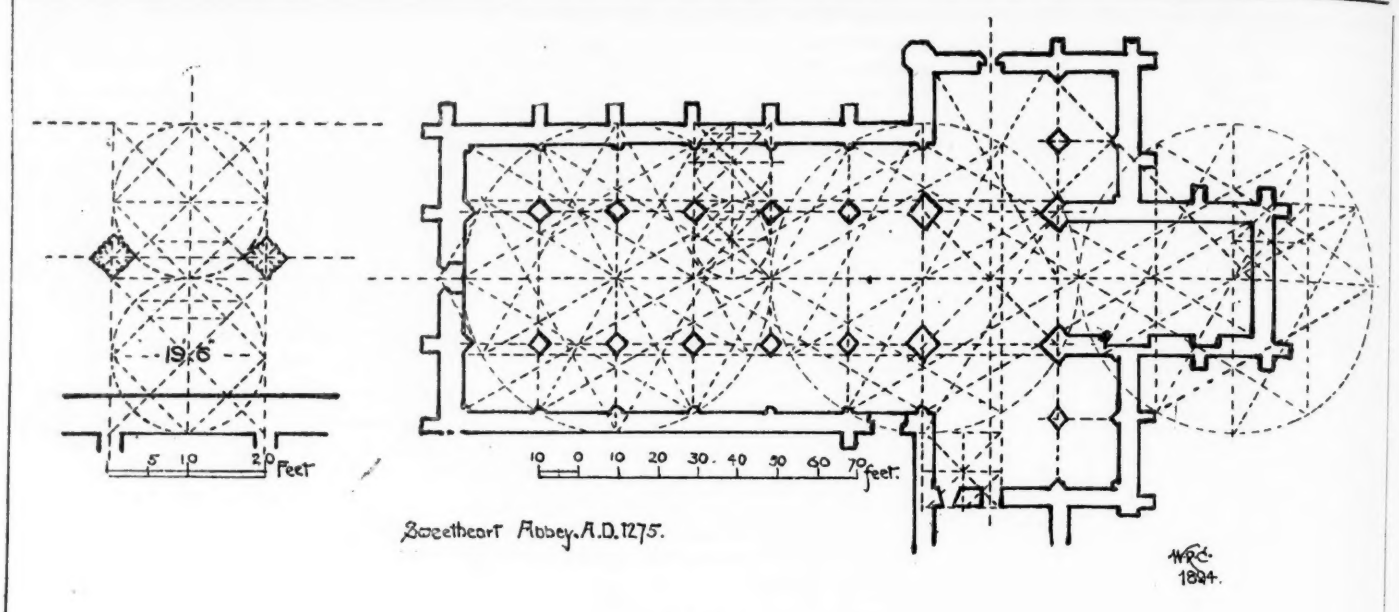


Fig. 7.

drawings, and the third for enlarged portions, such as doors, windows, &c. It follows that every detail bears a reference to the normal dimensions on which the rooms are drawn. In the rooms planned with either the diagram or intersecting squares, the position and the size of every door, window, fireplace, or other feature may be found geometrically. The relation of the leading features of a house to one another also is determined by the diagram, but how to use it each architect working with it would determine for himself. It is a tool, not a machine.

Gilbert Scott used, I believe, for gables a numerical proportion, 7 ft. base to 5 ft. height of the triangle, or something of that kind. Viollet le Duc, in a similar way, gives a proportion for a pointed arch, intermediate between a semi-circular one and an equilateral one, 8 ft. base to 5 ft. high. I do not think the mediæval architects worked that way.

For the gable take *a b* (fig. 3) for the height; the result is the same nearly, but the method much better. The other way is simply a rule for copying.

For the arch: *a b c d* (fig. 4) is a square bay of vaulting; in plan, *d a b* curve is the semi-circular diagonal rib; in profile, with the same radius describe arches and wall-ribs *a b*; *b c*, &c., and you have the proportion which Viollet-le-Duc's formula aims at. By this method one template serves the stone-cutter for all his ribs. (Herein lies the root of pointed architecture, *i.e.*, with groined rib-vaulting came in the pointed arch, and all else followed). This method is much more draughtsmanlike work, and easier, too, than dividing into sevens or any other arithmetical proportion.

Viollet-le-Duc calls the arch alluded to Egyptian. He does not say why, but evidently because the Great Pyramid and others have the proportion 8 base to 5 height. My belief is that the Pyramids were designed geometrically, and that those which have the proportion 8 to 5 have the heptagon for their initial, and that the side has the seventh part of a circle for its slope. Other pyramids have other angles found geometrically, one from the square and its diagonal, like the arch given above; another from the dodecagon.

Besides the proportion for an arch given above there are others found in a similar way by the use of the ruler and compasses, and it may be taken for granted that in this way they were usually by the mason delineated for construction. I have tested many arches in Viollet-le-Duc's "Dictionnaire," and have rarely failed to find them conform to one or other of these methods. To transfer a design to full size a workman needed only the width of the arch—no figures required to define centres, or to give radius. The radius, where it is found on the above diagrams (fig. 5), is marked *a*, *b*, in each example. The choice of which of these to use in each case rested with the designer, and its fitness depended on his judgment (except when, in vaulting, it determined itself). No. 2 is, perhaps, more frequently found than any other. In No. 1 the angle, *b*, *a*, *c* is 30 deg.; in No. 2 it is 45 deg.; in 3 and 4 it is 60 deg.

It is worth noting that the radius of No. 3, *a*—*b*, which is the minor radius of a hexagon,

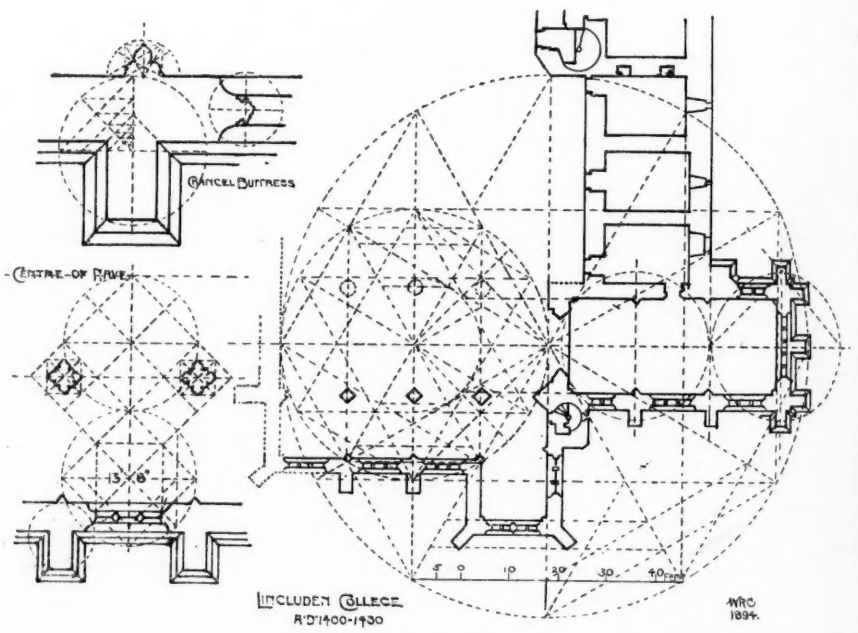


Fig. 8.

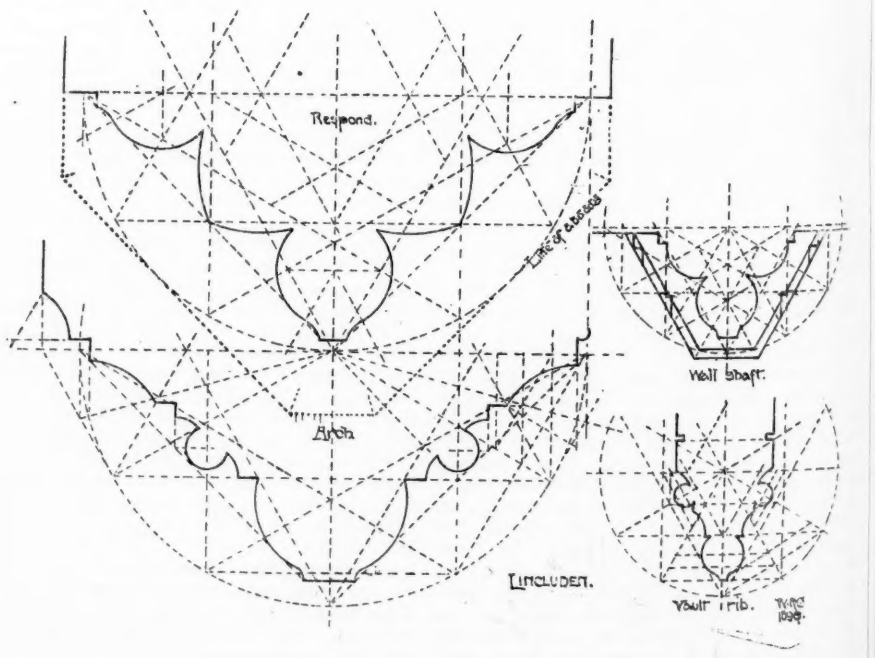


Fig. 9.

gives the length of a side of a heptagon, a fact which I have not found noticed in any book. But, farther, on the fully-developed diagram may be found lines giving the length of the side of polygons up to one of eighteen sides, and also one of twenty-four sides; that is, within a circle of, say, 8 in. diameter, delineate the diagram, and within that a second (4 in. diameter), and in these may be found the length of the sides of polygons of 3, 4, 5, 6, 7, &c., sides up to 18.

It is worth while for an architect to fix in his mind, or have a memorandum at hand, of the numerical relations of the side of a square to its diagonal, 5 to 7·071; and of the side of an equilateral triangle to its height, 5 to 4·33 (or 10 to 14·14; and 10 to 8·66).

It is important to notice that equally in the hexagram and tetragram the radius is bisected, and consequently the two diagrams correspond at that line and its repetitions in diminishing (or increasing) ratio. Coincidences therefore will be found when the two are used on the same plan.

The proportion of gable shown (in fig. 6) is often found in parish churches. In cathedral churches the equilateral triangle is required because of the greater height of the building. When the proportion shown is used in domestic work, and there are dormer windows, it will be found desirable to use the equilateral for the window gable, otherwise the angle will seem less than that of the gable. (The angle is 54° 42′, the same which polarises light.)

I have used the plan of Sweetheart Abbey (fig. 7) church because:

1st. The plan is from my own measurements.

2nd. It has never been altered or added to.

3rd. Early examples like this are likely to show a more simple use of the system than those of later date or those which have been partially rebuilt. The date is 1275.

It will be noticed that the position of the piers, and the position and thickness of the aisle walls are determined by either hexagram or squares.

I have found in a number of cases that the lozenge form which includes *three* bays seems to have an influence on the design, particularly in determining the length of the chancel and the transepts, but it is difficult to say whether this is a *leading* feature, or only incidental to the method adopted—probably the latter.

Errors or adjustments which have been made by the builders in setting-out their work are, of course, disregarded. For instance, in this church the respond at the west end being less than half a pier, the first pier is brought a few inches westward to equalise the arches; also, the piers at the crossing being larger than those of the nave, that one next to the crossing is also brought some inches westward with the same view. Again, the south transept is 3 in. longer than the north; this difference is accidental, no doubt, while the former are intentional adjustments.

The transept chapels are the only parts of the church that were vaulted.

The plan of Lincluden College Church (fig. 8) is a contrast to that of Sweetheart. Originally founded for a convent of nuns in the thirteenth century, it was changed into a college for men some time previous to 1400 by Archibald the Grim, Earl of Douglas, and a rebuilding was then commenced. When my drawings of it were made in 1846, the west wall and the north, and the north arcade piers, which are those of the original church, gave no sign. Since then their foundations, or such part of them as remain, have been laid bare, and their position I have taken from a plan given to me by Mr. Barbour, the architect who directed the work. I am not sure, however, that the north wall is from actual remains or from conjecture only.

The oldest portion of the rebuilding is the wall separating the nave from the chancel. The lower part of the wall has a doorway, and supports a rood-loft. Its architectural features indicate a different architect from him who carried out the remainder of the works, and are markedly inferior to these. The normal dimension of the nave—13 ft. 8 in.—is that of the original church, but the plan is rearranged in the position of the piers and of the south wall. The chancel normal is one-eighth more—15 ft. 4 in.—externally, but internally 14 ft. 8 in., and there is, therefore, a complication which it was not easy to unravel. The 14 ft. 8 in. is used for all the features of the chancel internally, including windows. The manner in which the diagram is applied to the different parts shows a man of independent thought, and all his work indicates a man of consummate ability and taste. It must be noticed that the normal dimension is used throughout the details—*i.e.*, 13 ft. 8 in. in the nave and 14 ft. 8 in. in the chancel, but here and there with an accommodation—for instance, 7 ft. 2 in. for 7 ft. 4 in.—in several places. In the case of the windows it has been apparently for the purpose of having the glazing dimension exactly 2 ft.

The chancel was rebuilt, there is no doubt, at the instance of the Princess Margaret, daughter of Robert III., and widowed Countess of Douglas, who made gifts to Lincluden in 1429, and who was buried in a sepulchre in the north wall of the chancel. The architect, there is as little doubt, was John Murdo, who designed the finest parts of Melrose Abbey about the same time.

The respond and arch mouldings (fig. 9) given are from the work of John Murdo's predecessor, and are not, in my opinion, elegant, but they show the manner of using the diagram.

Since beginning to write these notes I bethought me of a plan of the Parthenon in my possession—a stray print from some French book, well engraved to a scale of about 18½ ft. in an inch. The scales given are in French feet and mètres, and some dimensions are given in English feet. The plan is probably a copy of that in Stuart and Revett's great work.

I rather expected that a diagram of squares would be found to rule the plan, and was surprised to find that the same mode of setting-out the leading lines had to be followed in this case as in Mediæval work.

Two circles on the centre line would divide the fronts into eight bays and the flank into sixteen, and give the position of all the external pillars, provided there were no variation in the intercolumniations; but those at the angle being smaller, the operation is not so straightforward.

In each circle inscribing the diagram, the leading lines give seven centres of intercolumniations, and consequently the positions of six pillars of each portico; lines connecting the outer pillars define the flank walls outside, and a line of the diagram defines the same inside, thus fixing the width of the treasury and atrium (I am not sure that I use the correct terms). The wall at the rear of each portico is also defined by lines of the diagram. Then, falling back on the older method, the internal space is divided into squares. For the length of the treasury the space is divided into ten, and seven parts of the ten are taken for the width of it; the squares formed by these lines define the position of the six pillars and their size, and the width of the doorways.

The atrium is five squares in width and eight in length; the outer squares define the lines of the pillars, and the centre pillar on each side; the spaces between the corner and central pillars divided into five give the remaining pillars.

Instead of taking the tangent-line of the circles for the line of the step along the flank, the line of the side of a dodecagon is taken.

The line of pillars on the flank is obtained from the intersecting squares in the manner on the plan, and the first interval being made equal to that on front (now defined) the space between the second pillar and the centre one is divided arbitrarily into seven, giving spaces about four inches greater than on the front.

The inner line of portico pillars is midway between pillars and wall, and the space is divided arbitrarily.

It is certain that Sir Christopher Wren designed with the help of geometry, of which he was a master, and his pupil Hawksmoor, to judge by his church of St. Mary Woolnoth, followed his example. That Sir Charles Barry used some system of proportion was evident to me long ago, but I have lately examined a plan (which happens to be among my papers) of the Mansion House of Lord Tankerville at Walton, Surrey, of which Barry was, I believe, the architect. It seems to be a new wing to an older house, or perhaps a rebuilding. There are five principal rooms, all determined in proportion by squares, but not equal squares in all rooms. They are:—

a. Dining room	35 by 21 ft.	—	5 to 3 by 7
b. Bed room	28 ,, 21	,,	4 ,, 3 ,, 7
c. Breakfast room	28 ,, 21½	,,	4 ,, 3 ,, 7
d. Library	39 ,, 21½	,,	9 ,, 5 ,, 4⅓
e. Lord T.'s room	28 ,, 18	,,	3 ,, 2 ,, 9, or 6 to 4 by 4½.

(the dimensions are from scale, not figures). In *c* and *e* the position and perhaps the width of the windows are determined by the squares, but not in *a*, *b*, *d*, (except, of course, the central), and the doors are not in any case, so that the proportioning would seem to have been numerical rather than geometrical. In the approach to the corridor, however, intersecting squares seem to rule.

I have referred to the Temple at Jerusalem as having been designed on squares of 5 ft. The porches or piazzas which form a main feature of the architecture were 10 cubits wide, each bay 10 cubits, and the pillars 2 cubits. The plan which I give of a bay at the angle of the court shows how probably the size of the pillar was determined, and also the manner of turning the angle. This combination of pilaster and pillar is to be seen in the monument called Absalom's; in the ruins of the Synagogue at Capernaum, and elsewhere. I am fanciful to think that it was used *first* in Solomon's Temple, and perpetuated in the succeeding temples and in other buildings, just as the semicircular flight of steps in the Court of the Women has its successors in Jerusalem and elsewhere at the present day.

The plan of the gateways which gave entrance to the Outer and Inner Courts, as minutely described in Ezekiel xlvi., is in its main arrangements preserved to us in that gate of the eastern wall of the Harâm, called the Golden Gate. The geometrical foundation of this plan is well worth study. The circle is of 20 cubits diameter; the third compartment from the circumference gives the diameter of the pillars (1 cubit); then lines being drawn at 45 deg. from the angles *a*, the position of every pillar is obtained, giving bays 6 cubits square (or 7 taking centre to centre of pillars). A space 20 by 15, which is in the proportion of 4 to 3, is converted into that of 3 to 2 by placing the side pillars inside of the fifteen, and the end pillars outside of the twenty; the centres of the pillars are then 21 by 14, and the six square compartments are defined.

A study of the chevets of French cathedrals is not only interesting but very useful, in that it is an example of how much variety can be evolved in one feature. No two are alike throughout. The initial step may be the same in several, but each one is worked out in a manner peculiar to the man who designed it. Notre Dame at Paris (fig. 10) is further peculiar among all those given by Viollet-le-Duc in that its 1oot is a polygon of nine sides, and it alone is so designed that a pillar (of the second Order) stands on the axis line of the church. Viollet-le-Duc highly commends the way in which this chevet is designed having regard to the exigencies of the vaulting and the distribution of the points of bearing and thrust. With regard to effects in perspective it is not perhaps possible to judge from a plan.

An angle of 120 deg. contains three sides of a nonagon; that angle can be divided into three geometrically, and each of these again into three, so that not only a nonagon but a polygon of twenty-seven sides can be constructed by rule and compasses, and it may have been the knowledge of this property that suggested and prompted the use of the nonagon instead of the more usual dekagon (*i.e.*, five sides of the one or the other.)

The fact that no other chevet shows a pillar on the axis line has led me to draw the plan called a "suggestion" (fig. 11)—a plan based on the same initial lines, but with ten instead of eleven pillars in the second circle, and consequently a vista on the axis, and towards north-east and south-east. I imagine that the perspective views would be better on this plan.

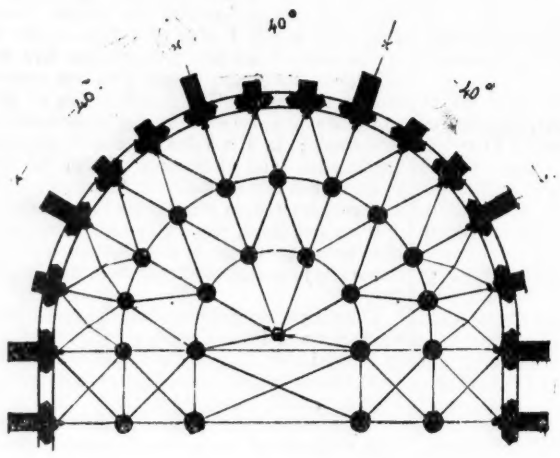
Another use of the nonagon is in the chapels of the Cathedral of Reims; probably also the eastern chapels of Sens and Canterbury.

The apse of the south transept of Soissons Cathedral is a semicircle divided into three, and each third again into three, with subordination of pillars. This arrangement also may be set-out geometrically.

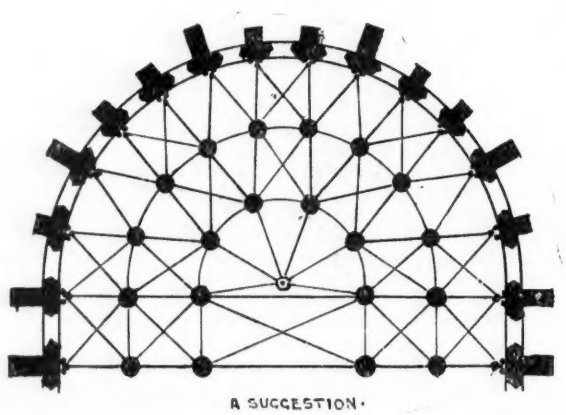
There is one example (in Viollet-le-Duc) of an apse with the angle of the polygon on the axis line, namely, the timber-built church of St. Gilles, at Troyes, a half octagon apse. The arrangement is not to be commended. Having seen two instances of it in modern domestic architecture, one four-sided and one six-sided, I can say that the external effect is faulty in this respect, that there are no lines corresponding with the horizontal lines of the house, and the eye is baffled and unsatisfied. Internally it is always preferable to have a void rather than a solid on the axis line—especially when the windows are grouped.

In Gwilt's Cyclopædia a theory is mentioned with approval that the number of bays in the apse of a church, and the number of bays in the nave have a numerical relation to each other. If there be five bays in the apse, then ten in the nave; if seven in one, then seven or fourteen in the other. Among the plans given by Viollet-le-Duc the following do not agree with the supposed rule:—Soissons, Cologne, Sens, Tours, Mons. If the tower bays be counted in, then Chartres, Amiens, Noyons do not agree. If the tower be left out, then Reims does not agree. There is no logical con-

Fig. 10.



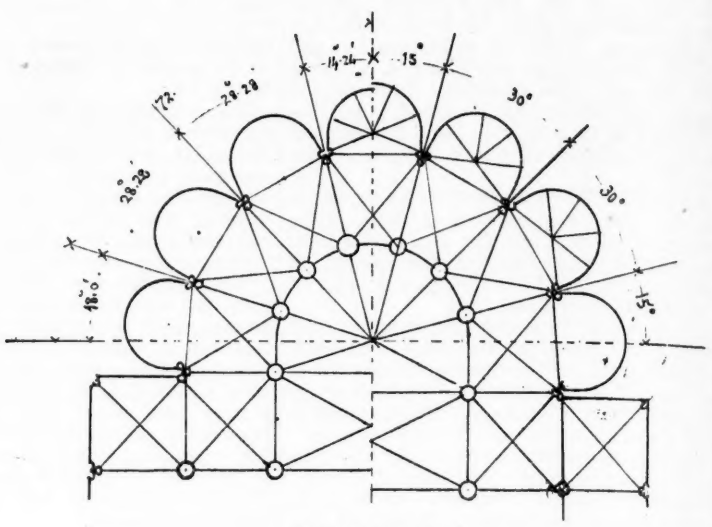
NOTRE DAME—PARIS.



A SUGGESTION.

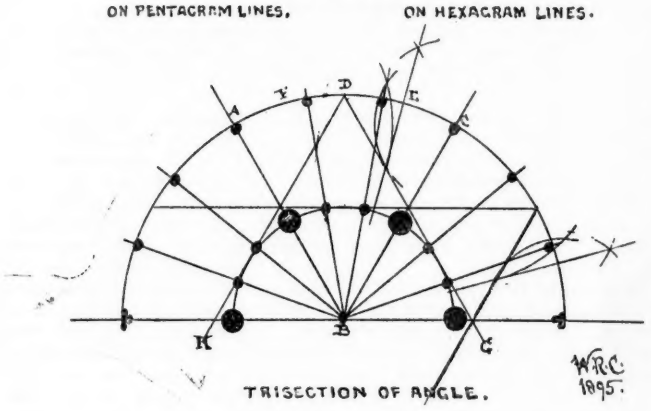
Fig. 11.

Fig. 12.



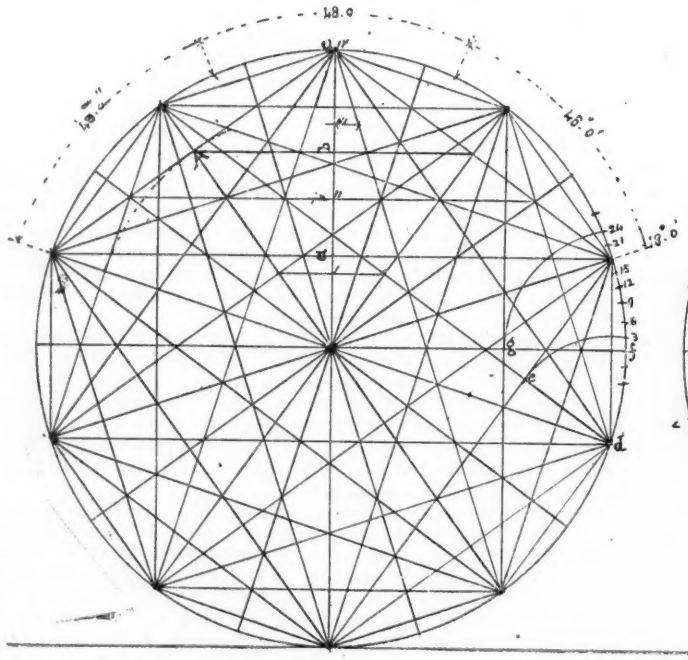
APSE OF SEVEN BAYS

ON PENTAGRAM LINES. ON HEXAGRAM LINES.

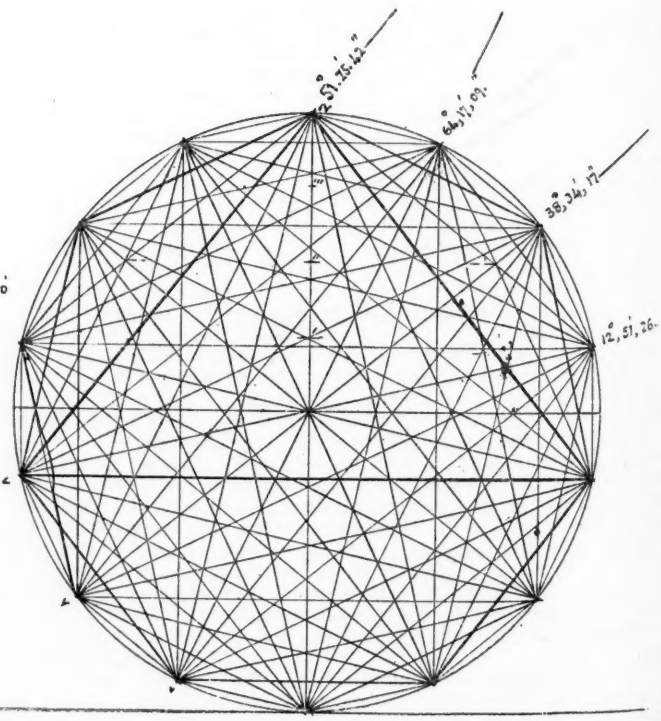


TRISECTION OF ANGLE.

Fig. 13.



PENTAGRAM.



HEPTAGRAM.

Fig. 14.

nexion between the two constituents. If in any case one has been made to rule the other, it must have been simply the fruit of a whim, a caprice, on the part of the designer; but is there any foundation whatever for the statement that there was such a rule?

In Vol. IX., p. 212 of Viollet-le-Duc is a skeleton plan of the apse of the church of Notre Dame de Vaucelles, taken from the sketch-book of Villars de Honnecourt (church destroyed in 1793). It is half of a polygon of fourteen sides. This is not often found. The only one I have noted is that of Mans Cathedral of the eleventh century, replaced in the thirteenth century by an apse having seven sides of a dodecagon; this is the usual mode when the apse has seven bays, the reason being that a counter thrust to the arch-ribs of the vault is obtained within the apse itself, instead of being obtained from the adjoining bay of the chancel.

The twelve-sided polygon of which seven sides are used in the plans of quite a number of apses is not a regular one of twelve equal sides (at least, not always). They seem to be thus:—The angle which includes two sides of a pentagon (144 deg.) is divided into five bays; and the other two bays are exceptional, and vary in proportionate width (or seem to do on the plans, but these being on a small scale, and not intended to show minute details, the variances may be more

in seeming than in reality). Viollet-le-Duc gives Amiens apse to a larger scale, and according to it the angle contains 142 deg., instead of 144 : there may have been a little adjustment, or it may be a slight error in the plan. It happens that one-fourth of the radius of a circle in which a pentagram is inscribed divides the angle (144·0 deg.) into ten, and thus are obtained the centre lines of each pillar, and each chapel. It is easy to divide a line into four, but it so happens that the lines of a pentagram fully drawn divide the radius into a fourth and a half, and consequently three-fourths.

In fig. 12 are shown these two methods of planning an apse of seven bays, and (fig. 13) the geometrical trisection of an angle. I have not seen any demonstration of this problem.

To trisect an angle A B C. Bisect in D, and again in E and F (dividing the angle into four). From D draw two sides of an equilateral triangle. With D as centre draw an arc, touching the radial line E B, and with E as centre draw an arc touching the line D G :—then a radial line drawn from the intersection of these two curves gives one-third of the angle, and the process repeated with F as centre gives the other third.

Fig. 14 shows the developed diagrams of the Pentagram and Heptagram. The lesser radius of the pentagram divides the angle 144 deg. (which comprises two sides of the pentagon) into three† as shown. In the heptagram the lines of the great pyramid at Ghizeh (and of others) are indicated by thicker lines of the diagram. The angle is 51° 25′ 42″.

† The radius being 1·00 the chord of 48 deg. is	·8134732
And the perpendicular of the pentagon is	·8090170
Showing a difference of ...	·0044562
The line *a*—*b*, or line *b*—*c* on the pentagram gives the side of a polygon of eighteen sides, the latter being (with radius 1)	·3472964
And the former	·3454915
Difference	·0010849

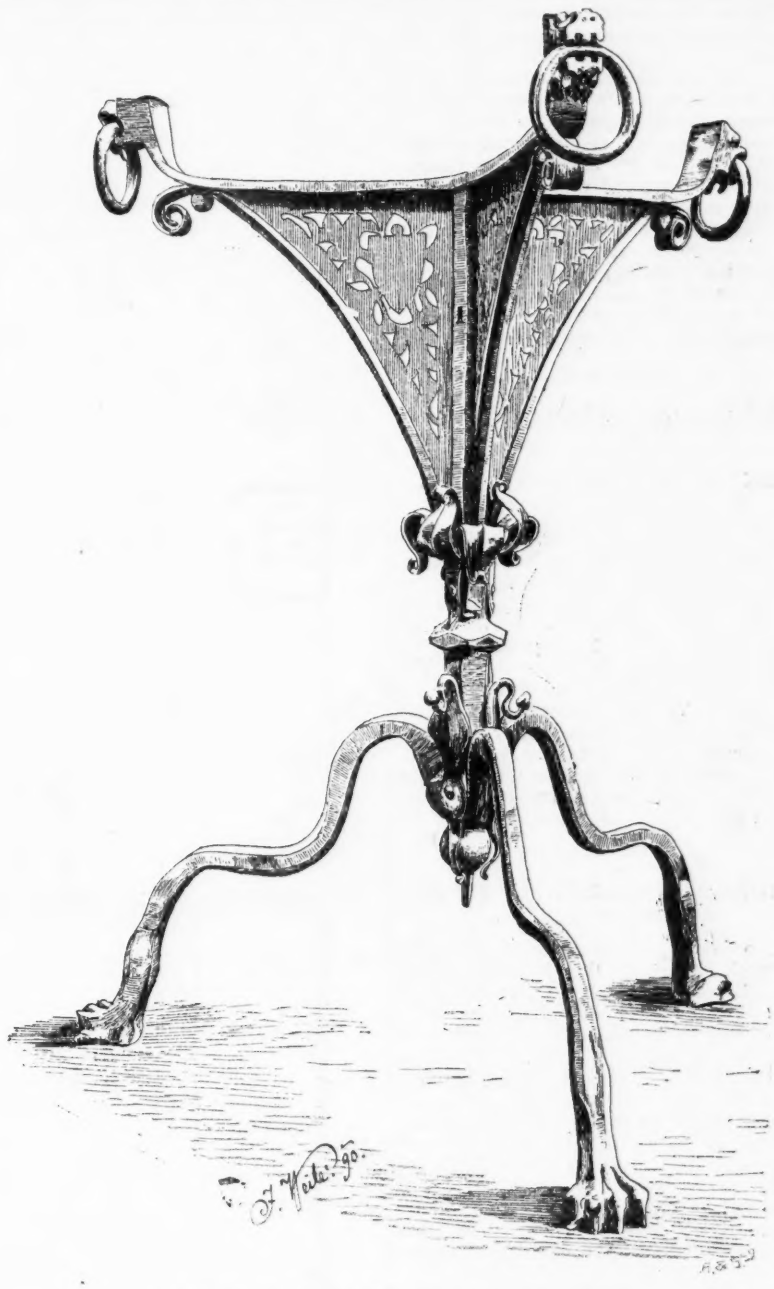
With centre *d*, the radius *d*—*c* marks off 21 deg. on the circle ; and with centre *f* the radius *f*—*g* marks off 24 deg. These being repeated from the twenty radii, and the arc of 18 deg. being bisected, the circle will be divided into 120 spaces of 3 deg. each.

Chord of 21 deg....	·3644710
Radius of curve	·3632712
Difference	·0011998
Chord of 24 deg....	·4158224
Radius of curve	·4122147
Difference	·0036077

* I do not say that the division is mathematically true, but it is so nearly true as to be sufficient practically.

TRIPOD FOR A CHAFING PAN : SIENA.

THIS is an example of the characteristic mediæval metal-work in which Siena abounds. The square conventional treatment of the animal heads, or rather suggestions of heads, which hold the rings, is a good example of design suited to the material and situation. The treatment of the feet is somewhat more naturalistic, though very free and bold.



Tripod for a Chafing Pan : Sta. Caterina, Siena.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS :

PRIZES AND STUDENTSHIPS FOR 1896-97.

THE fifth general meeting (business) of this Institute for the present session was held on Monday last, the President, Professor G. Aitchison, A.R.A., occupying the chair.

The minutes of the previous meeting having been taken as read, the following gentlemen were elected, viz. :—As *Fellow*, Mr. A. B. Pinckney, M.A. Cantab., Henwick, Worcester ; and as *Associates*, Messrs. H. J. G. Smith, London ; P. A. Robson, London ; and H. W. Walker, London.

The Deed of Award of the prizes and studentships for 1896-97, made by the Council (in accordance with the terms of by-law 66) was then received. The following is the list of successful candidates and competitors :—

Institute Silver Medal and Twenty-five Guineas (*Essays*).—Subject : The True Value of Tradition and Precedent in Architectural Design. The Medal was not awarded, but the sum of Fifteen Guineas was voted to the author of the essay under motto "Things New and Old"—viz., Mr. John J. Cresswell, A.R.I.B.A., of Grimsby.

Institute Silver Medal and Ten Guineas (*Drawings*).—Awarded for the drawings, under device of fleur-de-lys within circle, by Mr. Fred. J. Wass.

The Soane Medallion and 100*l.* (for Continental Travel).—Awarded for design for a Provincial Market Hall, submitted under motto "Russet," by Mr. J. A. R. Inglis, A.R.I.B.A. ; Medal of Merit to Mr. James A. Swan, "Labor ipse Voluptas" (Birmingham) ; Certificate of Hon. Mention to Mr. Charles H. Holden, "Éléphant d'Argent" (Bolton).

The Pugin Studentship : Silver Medal and 40*l.* (for Travel in the United Kingdom).—Awarded to Mr. William Haywood ; Medal of Merit to Mr. J. A. Swan ; Certificate of Hon. Mention to Mr. W. E. Dobson.

The Godwin Bursary : Silver Medal and 40*l.* (for Travel outside the United Kingdom). Awarded to Mr. R. Stephen Ayling.

The Owen Jones Studentship : Certificate and 40*l.* (for Travel outside the United Kingdom) : Awarded to Mr. A. E. Henderson.

The Tite Prize : Certificate and 30*l.* (for Travel in Italy).—Not awarded.

The Grissell Gold Medal and Ten Guineas (for Design and Construction).—Subject : Design for a Bay of a Church. Awarded for design, under device "Heart and Shield," to Mr. Sydney K. Greenslade.

The Aldwinckle Studentship : a Certificate and 50*l.* (for Travel in Spain).—Awarded to Mr. A. T. Griffith.

The Ashpitel Prize.—Awarded to Mr. T. D. Brooks (Doncaster).

The meeting then adjourned.

The next meeting will be held on Monday, when the President will deliver an address to students ; and some critical observations on the students' work will be made. Subsequently, the presentation of prizes will be made by the President. Prior to the distribution of prizes, Mr. Alfred Waterhouse, R.A., the new Chairman of the Board of Examiners, will present, on behalf of past and present members of the Board, a testimonial to Mr. Arthur Cates in recognition of his long and valued services as Chairman of the Board.

ENGINEERING SOCIETIES.

LIVERPOOL ENGINEERING SOCIETY.—The fifth ordinary meeting for the present session of the Liverpool Engineering Society was held on the 6th inst. in the Royal Institution, Colquitt-street. Mr. George Farren, J.P., of Carnarvon (Vice-President), occupied the chair. Mr. James Glover, jun., M.A., Assoc.M.Inst.C.E., read a paper entitled "Some Notes on Current Specifications and Tenders for Public Works." The lecturer dealt with a few points in connexion with specifications and quantities which in many current documents were the reverse of reasonable, and which led to much friction and irritation between engineer and contractor, coupled very often with great financial loss to the latter. After referring to the classes of current risks, and to the arbitration clauses in specifications, and also giving specimens of the most unreasonable he had met with, he concluded by suggesting that a well-thought-out scheme

with variations of conditions and quantities within well-defined percentage limits, and with well-defined corresponding percentage price allowances for plus and minus excursions from the schedule average, together with an arbitration clause removing the final appeal from the engineer to a mutually respected and accepted umpire, must inevitably tend to improve the design, workmanship, quality, and progress of the contract work by enabling the engineer and the contractor to devote their respective special talents solely to the accomplishment of the work in hand, and without the irritating, distracting, and paralysing disputes so common when the extrinsic risks were not fairly provided for or excluded. A discussion followed.—*Liverpool Mercury.*

Illustrations.

DESIGN FOR DECORATION OF A ROOM IN GRAFFITO.

THE chief object of the artist in the conception of this "Design for the Decoration in Graffito of a Room," was the introduction of the real Italian graffito in monochrome. The graffito is distributed all round the walls, the colouring being introduced in the pictures on the ceiling. The lightest tones of the graffito are cream, and the shadows sepia. The architectural parts should be in marble of some warm colour, or in stucco of the same colour, with some gilding. The principal subject represents the ancient Grecian game of ball. The smaller designs represent various sports, and the subjects on the vaulting are the Elements. C. F.

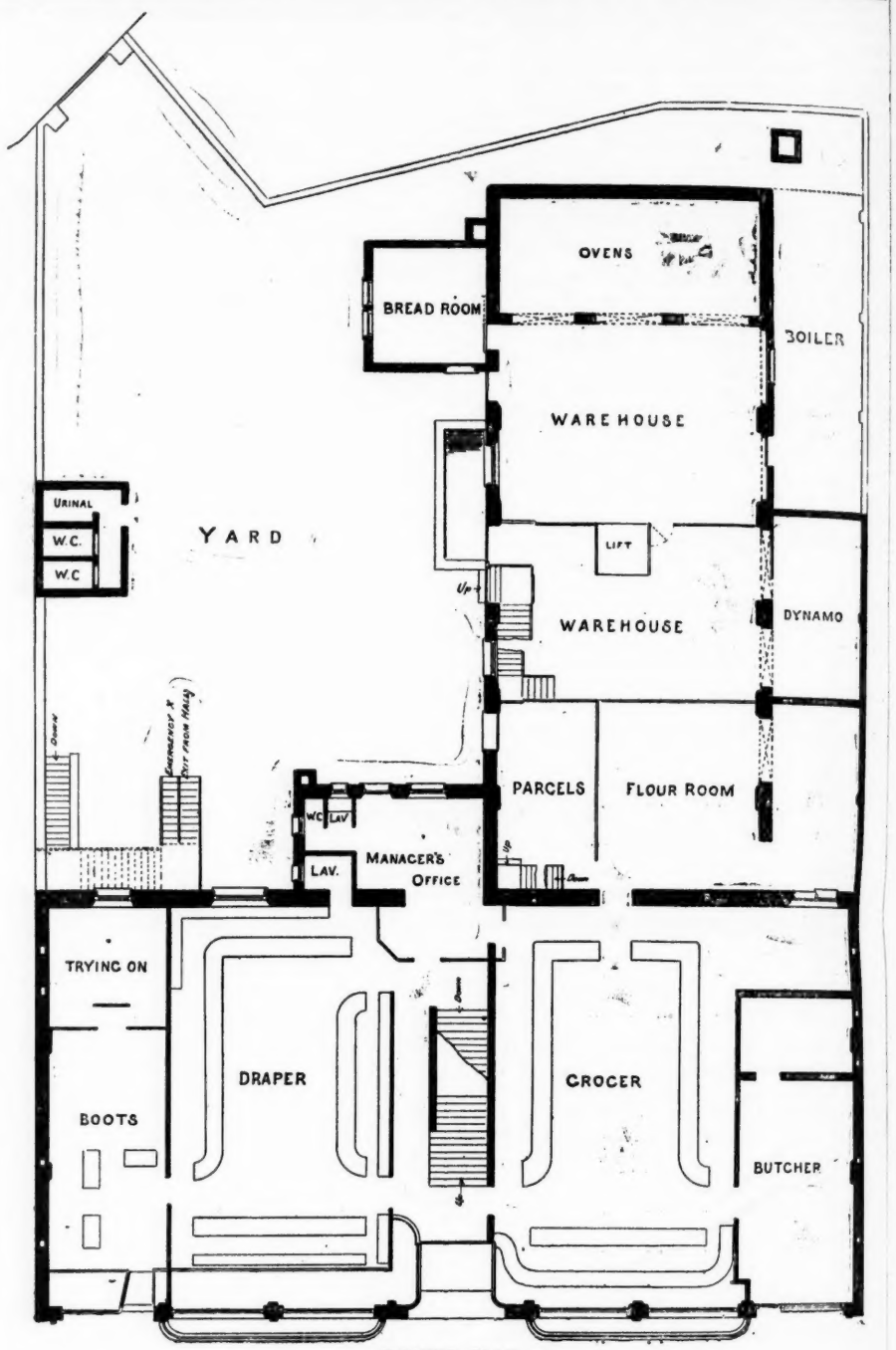
INTERIORS, NEW TECHNICAL SCHOOL, LIVERPOOL.

THE two drawings of the Technical Schools at Liverpool, represent the interior of the entrance hall and of the students' lecture hall, as intended. The former is top-lighted, and has a cloak room upon either side, while the entrance to the lecture hall is seen at the end. The lecture hall itself is about 70 ft. by 40 ft. and 27 ft. high, occupying the height of two floors. It is proposed that it should be vaulted in fibrous plaster with a panelled dado, and the windows kept high up each side. It will provide accommodation for 400 students. It should be added that the drawings were made by the architect for his own purposes since the competition, and were not among the drawings submitted in competition.

NEW WING TO BOARDING-HOUSE, RUGBY.

THE house to which this addition was made in the summer of 1895 is one of the oldest of the Rugby boarding-houses, and the original building is a plain square stucco block of no particular style. Several years back Mr. H. Lee Warner, who was then its "house-master," added a small quad. on the east side of the old house, containing a hall, studies, and dormitories. These were built in the then fashionable Queen Anne style, and more recently a further addition was made on the south side of the house in a similar style. The present addition was made for the Rev. W. H. Payne Smith, and forms the north side of the quad. The drawing shows the outer front. As the new wing was to form the front to the boys' block, it was planned to harmonise with the style of the quad rather than with that of the residential portion, though there are many variations from the details of the rest of the boys' block in the new work. The available space was very much cramped, and a good deal of accommodation was required. This explains why some "fancy planning" had to be contrived (a most undesirable necessity). The materials were red sand stock facings with stone dressings and tile roofs. A good deal of rough-cast is introduced, and in the centre of the front is a coloured plaster panel, representing an oak tree—the house crest. This was made very cleverly by the builder, Mr. Linnell, of Rugby, who carried out the work most skilfully and promptly in the short space of the two months' summer holidays. The old buildings were dismantled on the first day of the holidays, and when the next term commenced the boys went straight into their new studies. Mr. Linnell's foreman was Mr. Barber, and Mr. J. T. Franklin, the school surveyor, kindly acted as clerk of works.

CHARLES A. NICHOLSON.



GROUND PLAN

SCALE

New Business Premises, St. Helens.

NEW BUSINESS PREMISES, ST. HELENS.

THESE premises have just been completed for the St. Helen's Co-operative Society, at a cost of upwards of 20,000*l*. The building is three stories in height, with cellar under the whole. The ground floor consists of shops for the various branches of the trade. On the first floor are showrooms, offices, and board-room, and on the top floor is a large lecture-hall. A feature has been made of the lighting of the basement by forming areas in front and carrying the shop windows down to the bottom. The wing at the back is devoted to warehouse purposes and bakehouse.

The front is faced with Ruabon red bricks and York stone dressings. The building is fireproof throughout, the floors being finished with oak blocks or mosaic; the whole is heated throughout by hot water, low pressure, and lighted by electricity, the lifts and hoists being worked by the same power.

The contractors were Messrs. Whittaker & Woods, of St. Helens; the fireproof floors, wood blocks, and constructional ironwork are by Messrs. Homan & Rodgers, of London and Manchester; the mosaic was laid by Messrs. Diespeker & Co., of London; and the architect was Mr. Frank S. Biran, of St. Helen's, from whose designs and under whose superintendence the work was carried out.

NATIONAL PRESS AGENCY.

THIS building, in course of erection on the Victoria Embankment in Carmelite-street, is constructed of brickwork in cement, faced with red bricks, all the dressings being of a warm, golden brown tint of terra-cotta (Messrs. Doulton & Co.). The building is of fire-resisting construction throughout.

The contractor is Mr. H. J. Williams, of Bermondsey, and the architect Mr. Edwin T. Hall, London.

TESTS OF STEEL AND CONCRETE FLOORS.

ON Monday last we had an opportunity of witnessing the testing of two systems of combined concrete and steel flooring, carried out in Manchester under the direction of Messrs. Maxwell & Tuke, architects. The first test was that of the floor patented by the Expanded Metal Company; an arched concrete floor, 4 ft. wide and 12 ft. span from centre to centre of the joists forming the abutments (11 ft. 6 in. clear span), with a rise of 12 in. and a thickness of 3 in. at the crown and of 4 in. at the springings, and having a layer of expanded metal (weighing about 1 lb. per square foot) embedded in the lowest portion of the concrete, was loaded uniformly with pigs of lead until it broke suddenly under a weight of

29½ tons, or 12·3 cwt. per square foot. The amount of deflection observed before the collapse was rather more than 1½ in. The second test was of the "Golding" floor, a floor which has been already largely used in America. Mr. Golding himself was present at the testing on Monday. The specimen tested had the same span as the arched floor just described, but was 2 in. wider. It consisted of two concrete ribs, spaced 3 ft. 6 in. from centre to centre, and each having the intrados formed with a 6 in. by 2½ in. arched steel channel, weighing 12½ lbs. per foot, and laid flat side down, the rise being 13 in.; over the two ribs, and united to them by the adhesion of the concrete, the floor itself extended, consisting of a flat concrete slab 3 in. thick, with a layer of expanded metal (similar to that in the first test) embedded in the lowest portion. With a load of 12 cwts. per square foot (*i.e.*, equal to that which broke the other floor), the deflection was ⅜ in.; but with increasing loads the deflection rapidly increased, until it amounted to no less than 4⅝ in. under a distributed load of 40·6 tons, or 16·2 cwts. per square foot. Darkness had at this time rendered further loading somewhat difficult and dangerous, and the floor was left unbroken under the load mentioned. When the load had reached nearly 16 cwts. per square foot a crack was observed in the underside of the flat slab, extending across it about the middle of the span, and under this load the deflection was about 3⅞ in. The greatness of the deflection was undoubtedly due in a large measure to the yielding of the steel framework between which the floor had been constructed, the spreading being no less than 1 in. when the maximum load was reached. The concrete in both cases was composed of 1 part of Portland cement and 3 parts of crushed granite passed through a screen with ⅜ in. meshes, and both floors were constructed thirty-three days before being tested.

We reserve comment on the tests just recorded, as we hope in an early issue to give fuller details of these and other tests, together with explanatory drawings. It is clear, however, that both floors attain great strength with a remarkably small quantity of metal, a further proof—if such were needed—of the extravagant waste of metal in most of the systems of fire-resisting floor-construction now in use in England. The tests made last year by Mr. Fowler and Sir Benjamin Baker—which we hope to record when we comment on this week's tests—show beyond question the enormous accession of strength gained in concrete slabs by the insertion of expanded metal, and, indeed, are a far better index of the value of the addition than are the tests made last Monday.

PETERBOROUGH CATHEDRAL.

THE Society of Antiquaries have printed and circulated their views as to the whole controversy about the West Front of Peterborough Cathedral, accompanied by the specification showing how they would treat it, which is signed by Mr. Thackeray Turner, Mr. W. R. Lethaby, Mr. Detmar Blow, Mr. Philip Webb, and Mr. T. J. T. Micklethwaite, with the rider of a testimonial from a member of the Institution of Civil Engineers, Mr. John Carruthers, to the effect that he is of opinion that the method suggested could be safely carried out and would be effective in making the building secure.

The controversial portion we must pass over; enough has been said about it. The specification we have not space to print in full, it can be obtained from the Society of Antiquaries, but we give those portions of it which refer to the question of the condition of the piers and vaulting, and the means proposed to repair them. After describing the work of underpinning the piers the specification continues:—

"The next work would be to look to the condition of the pier itself, between its foundations and the springing of the arch and vault; this would not be the least important part, for much would depend on its solidity.

It is possible that disintegration may not have occurred in its substance to any serious extent, but this would have to be ascertained. The signs of its condition, so far as they can have been observed at present, tend rather to the conclusion that the subsidence and pressure outward from the vertical have been so slow from the time it was built that the multitude of its parts have yielded, almost elastically, to the change in stability, so as not dangerously to decompose its parts, and the core with its ashlar casing may still be in a state of cohesion.

However this may be, no pains should be spared in finding out what *is* its condition; and after the plumbing, girthing, and testing of all its perpendicular lines have been done, the pier should be gently tapped with a wooden mallet on its surfaces, and the sounds at different parts listened to for any indications of hollowness. Should the sounding not be satisfactory, a stone or stones would have to be drawn from the flat surfaces of the pier inside, and the core examined in one place at a time. The triangular form of the pier in plan, and its being some 15 ft. wide on its inner side, would allow of the examination being made without risk, and of the core being consolidated without serious difficulty, in a similar way to that hereafter described in connexion with the spandrels of the great arches. Any process of penetrating securely into old walls depends upon the care and ingenuity of the men engaged in the operations and their director, with an avoidance of heavy blows, keeping to one hole at a time, and that of the smallest workable size; a watchful foreman of the works, under the direction of the architects, with a few picked men on whom they could depend, being the most important consideration in such work.

This pier, on which so much depends, having been secured in the whole of its height, attention would then be given to the springing line of the great arch and the vaulting, for complete consolidation here would be the basis for securing the great arch itself and the spandrels right and left of it.

Of necessity, a hole or holes would have to be made just above the springing line inside, where the metal tie-rods, which would have to be arranged at this level, would come. At present we are of opinion that two tie-rods should be used, so as to lay hold of a larger body of material at both ends than a single rod would allow.

The particular size and form of the rods would depend much upon the exact calculation of the holding, both on the arch mouldings as they set down on the capital of the pier, and on the least injurious form of anchorage to be found inside the west wall of the nave. At the present time we feel inclined to put a connecting metal plate at the end of the rods a little behind the quintuple attached shafting, which runs up from the ground to the base of the pinnacle between the spandrels. The form and exact position of this connecting-plate would have to be decided upon as the work proceeds. Two tunnel passages, to be made in the same way as hereafter described, would be the safest and soundest way of working here, and it may be that copper or tough bronze would be used for the rods, &c., or, if not, the most approved kind of iron or steel; in either case their strength would have to be tested before using. The making of one tunnel at a time would allow of taking greater pains with the new consolidating material to meet the strain both above the springing line and below.

The consolidation of the walling here, in connexion with the tie-rods, having been done and allowed to set, the tympanum space at the back of the pier, between the decorative arching and the wall rib of the vaulting at the base of the great pinnacle, would afford easy and secure access to the core of the walling in the centre; and further penetrations would also be made without difficulty or risk from the hollow pockets of the vaulting right and left.

We now come to the very important point in connexion with the present repair of the front, the manner in which the great arches can be safely and securely strengthened, *without having recourse to rebuilding*.

It has already been noted that the internal parts of the walling of the northernmost arch have expanded from east to west during the slow settlement of the detached pier below; and in a lesser degree this is probably the case in the other arches also. The substance of this walling must therefore, to a greater or less extent, be in a state of disintegration, and its removal and replacement by sound masonry are essential to the permanent stability of the narthex. The manner in which this may be done *without risk or danger either to the building itself or to the men engaged in the work*, is as follows:—

In the rubble walling, which has no ashlar facing at the back of the arches, beginning at the lowest point, a hole or tunnel, just wide enough for a man to work in, would be slowly driven by short sections at a time. The sides and roof of each section would be made absolutely secure by timber framing before beginning the next one, and the hole would be gradually carried through the wall to the back of the facing stones of the wall itself. The hole would in no case exceed 6 ft. in length. Any possible danger from the running of disintegrated material would be met by the prompt application of short lengths of 3-in. planking, thickly coated with wet clay, and held in position by workmen while props with expanding screws are applied to the ends, so as to press each plank well home and keep it in place. Moreover, only one tunnel would be made at a time, and this would be filled and pinned up (with sound material, as hereafter is described) before another one is begun; it would therefore bear but a small proportion to the area of the wall bored into. The new filling would thus support the work above it until that in its turn was removed.

Clearly, when doing this underbuilding in the spandrels of the arches, the chief danger in underpinning foundations, namely, the great superincumbent weight, would practically be non-existent, owing to the comparatively slight structure of the gable above. The only danger to be faced, the possibility of the sides or roof of the holes falling in, would be effectually guarded against by the precautions already described.

The process of consolidating the walling of the west front, above the piers and overlying the arches, is simplified by the great thickness of the walling at this part of the work under consideration; and the foregoing indication of a very complete system of timber support to all the weight and thrust of the work above the springing line of the arches shows that any disturbance caused by the execution of the work would be met at all points by the counter support. Extra support in detail would have to be supplied from time to time, so as to make sure that no further dislocation of material would happen, as the supporting framework would be brought into action as soon as the slightest movement took place.

The principle underlying this working by tunnel into the walling from the inside, at the back of the ornamental ashlar stonework on the outside, is that of applying horizontal bands of very hard material at certain distances apart vertically, so as to become, as the work proceeds upwards from the springing line of the arch, something analogous to 'cantilever' construction used in modern iron bridges; that is, a corbelling out right and left from the central axis of the piers below till the bands from opposite sides meet over the centre of the arch between its two piers. The bands of hard horizontal material thus act as ribs, and the filling in between them as support to the ribs.

As has been said before, the very thickness of the walling is of assistance to this kind of work, for these bands or ribs, having a great horizontal width, have also considerable power in lateral resistance to bulging.

As this laminated corbelling and its interfilling is passed on to the outer surfaces of the arching, the weight before carried by the arched rings alone is then shared by the renewed core of the walling. Also, while this process of relief and strengthening is going on, each of the orders of the arch is caught up and securely connected by natural adhesive bonding, or, when needful, by dowels of hard material; and at the same time the spaces between the rings of the arch, which have opened on account of settlement, would be securely filled and incorporated with the work behind.

The horizontal bands, or ribs, which were constantly used in the best Roman walling, served more than one office in construction, as they were, so to speak, built in compartments, and the rubble or concrete lying on this laminated bond of two or three joint-broken courses stopped the running down of the water from the new rubble above them to the rubble below, that having already been saturated with grout.

It must also be understood that these laminated bond courses would be of the whole thickness of the wall from the back of the facing stones to the inside face of the wall lining, and on these would be built, or put in, the rubble or concrete filling. While the work in each tunnel was being done, these horizontal bonding courses would be thrust into and under the sides of the walling of the holes beyond the general width of each tunnel; so that after one tunnel was filled up, and a sufficient time was allowed for setting, another parallel tunnel would be made, and these outsailing bond courses would be caught up at the base of the fresh hole, and a continuous line of them would run as far as different circumstances would allow. . . .

In order to make the horizontal courses, or ribs, as strong as possible, we should mostly use the hard blue Staffordshire paving tiles, 1¼ in. or 2 in. thick, of the size 12 in. by 6 in., with smaller sizes of the same material to avoid cutting. These semi-vitrified tiles have great affinity with Portland cement, and are very holding.

We have specified rubble walling or concrete as the composition of the filling-in between the tile bands, but this work would be varied by the differences found to exist in the work of the core. Any solid parts of the core which might prove not to have been disintegrated would be well washed, and then laid hold of with new thin bonding stones or flat bricks, so as to range horizontally with any of the work met with on the way, which should not be disturbed; but the particular use of rubble concrete is great, for it can be pressed into the interstices of old walling, and lays hold of any connecting bonding from the internal irregular faces of the ashlar or other facing stonework. At different times, from the end of each tunnel, parts of the ashlar facing would be exposed to view, and all the gaps in it could be securely dealt with; the renewing of the bedding and pointing of the stones (an almost impossible work from the outside only) would be thoroughly secured, and attachments incorporated with the new backing.

It is highly probable that the quintuple shafting, up from the springing of the arches to the underside of the base of the great pinnacle between the roofs, will have been built back with much cube stone, and if this is found so, it will not have to be disturbed (unless in any way dislocated), but carefully embodied in the new filling in and band work of the spandrels.

So far as can be seen at present, the internal support at the base of these pinnacles is of solid and unfractured work, as is also much of the work of the gable proper, though here fractures or displacement of the stones would have to be dealt with, especially along the range of alternate window opening and niche work.

The gable proper, that is the triangular part resting on the continuous dentilled string-course, would present few difficulties in securing it after the strengthening of the foundation on which it stands (*i.e.*, the spandrels of the arch below it) had been consolidated. The alternation of windows and niches occurring in thinner walling than that covering the great arch, a far larger part of the work here is done in squared stone, and this would allow of the masonry under the base of the wheel window being made quite sound from the inside, so as to avoid displacing the weather-fretted stones of the bottom part of its circle; the joints of this stonework at this point could be thoroughly washed out from above, run in with new filling, and incorporated with the solidified work below, which would have been done from the inside. Any disturbance of the ornamental stonework on the outside would be most mischievous.

Doubtless, as the work proceeds from time to time, at the different parts of the walling, any scheme set down on paper now would have to be modified to suit the peculiarities of the various works as they become disclosed; caution while each part was being dealt with would have to be insisted on, and special contrivances put in practice to suit all situations. . . .

We need scarcely here say anything as to the repair and strengthening of the vaulting in connection with the great arch at this part of the front, save that we were much interested in the varied curves of the ribs resulting from the slow strain put upon them by the settlement of the piers; but they present no serious difficulty in the way of strengthening them as they now stand, when once the work on which they rest and abut is made secure."

The following architects add their signatures as approving the proposed method of procedure but admitting that they have not examined the building:—Robert Weir Schultz, F. W. Troup, Edward S. Prior, F. Inigo Thomas, Halsey Ricardo, Mervyn Macartney, P. Morley Horder, J. A. Cossins (Birmingham), H. Wilson, Ernest Newton, E. Guy Dawber, C. R. Ashbee, J. J. Stevenson, F.R.I.B.A., Chas. H. M. Mileham; to these Mr. Horsley and Mr. John Richmond desire to add their names.

COMPETITIONS.

LUNATIC ASYLUM, BELFAST.—A new asylum for 1,000 patients is about to be erected near Belfast. Competitive designs were invited, and Mr. Sydney Mitchell, architect—of Messrs. Sydney Mitchell & Wilson, Edinburgh—was appointed by the Irish Board of Works assessor to select the three best plans. He returned from Dublin on Monday, having given his decision on Saturday, though the names of the successful competitors will not be disclosed for some days yet.

MUNICIPAL BUILDINGS, DOUGLAS.—A special meeting of the Douglas Town Council was held

on the 6th inst. for the purpose of selecting plans of the proposed municipal buildings. Seventeen plans had been submitted by English and Manx architects, and the committee appointed to consider them, acting under the advice of Mr. Woolfall, of the Liverpool Society of Architects, recommended that the first premium should be awarded to the plan signed "Mona." After a prolonged debate this was agreed to. On the letter containing the name of the competitor being opened, the name of the successful architect was discovered to be Mr. Arthur Ardron, London. Manx architects take the second and third premiums.

WORKMEN'S DWELLINGS, SUNDERLAND.—Some time since the Sunderland Corporation offered premiums of 50*l.*, 30*l.*, and 20*l.*, to architects who chose to send in designs for the dwellings the Council propose to erect on the Hat Case site, which has been cleared of its dilapidated property. Mr. J. Slater, of London, was appointed to adjudicate upon the plans sent in. These were fifty-eight in number. The first award the assessor recommends should be given to "Pro Artifice," whose plan shows accommodation for 468 people in forty-two three-roomed dwellings and fifty-four two-roomed dwellings. Each tenement is provided with a bath. The total cost is estimated at 20,000*l.* The second premium the assessor awarded to "Homes," whose design is estimated to cost 23,351*l.* in carrying out. The number of persons provided for is 448. "Salis Populi" takes third premium, with provision in his plans for 402 persons at an estimated cost of 20,000*l.*

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The monthly meeting of this Society was held on Tuesday at the School of Art, Arundel-street, Mr. C. Hadfield, the President, in the chair. A lecture was delivered by Mr. Beresford Pite, President of the Architectural Association, on "The Study of Architectural Design," illustrated by numerous drawings, photographs, and blackboard sketches. He stated that the modern architect suffered from lack of artistic motive. He sought it in archæology and mere picturesque quaintness, there being now no traditional style or intuitive sense of beauty in architecture. No doubt this was as characteristic of our age as if it were quite otherwise, but it was impossible that the architectural student should be left without direction or serious intention in his study of design. Present purposes could perhaps best be served by seeking to excite enthusiasm from interest in detail work, and by understanding and analysing the beautiful qualities in the means employed in plans and working drawings, which were the instruments by which a beautiful building was obtained, and thus made up for the loss of genuine national architectural style. An architect's plans had a beauty of their own, and this was pointed out in some detail from many examples. This beauty was undiscernible in the building, and belonged to the embodiment in the drawings of the building. In the same way the sectional plans of buildings were examined, and the means illustrated from them of obtaining different architectural effects by a carefully-studied interest in the sections. Elevations were grouped in different classes dominated by general ideas, such as verticality or horizontality, concentration or distribution of ornament, a picturesque grouping of sky-line, or dignified severity. These points were illustrated from photographs and sketches, as well as grandeur of line, simplicity of rhythm, luxuriousness, a simple line with a rich surface, or a rich line. The students were exhorted to thoughtfulness in detail as being pre-eminently the road to good architecture. In conclusion, architecture was vindicated as a decorative art, and as such was the foundation of all art other than imitative. A vote of thanks was unanimously accorded to the lecturer.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—At a meeting of this Association, on the 8th inst., Mr. E. Preston Hytch (Secretary to the School of Art) gave an address, entitled, "The Architect as a Teacher." It was the duty of the architect, he said, to stimulate work in the allied arts. Amongst the grounds for hope as to the future of architecture in England, he said, were the increasing earnestness of architects themselves—an earnestness which had induced many capable architects to sacrifice to teaching in public classes, often at a pecuniary loss, much time that would otherwise be devoted to private practice. Birmingham was especially fortunate in this respect. The growing interest taken by people generally in art, the love of home, and even the possibility of the extended possession of houses which building societies afforded, the development of public spirit—all these were forces of which the architect should avail himself, and which he should adapt to the best ends. It was the duty of the architect to stimulate work in the allied arts; he could render to the community great service by facilitating the employment of worthy sculptors, mural decorators, wood-carvers, and others. In this way his influence would also penetrate beyond those craftsmen working immediately under his supervision. The attendance of young architects at the various classes of the Birmingham Municipal School of Art was fraught with advantage to all concerned. Domestic architecture, whose improvement Mr. Ruskin and Arthur Helps had enforced as a moral duty, and which was alike the best and the readiest starting-point, and national and municipal architecture, which should exemplify the highest life of the community, were considered in some detail. It would be worse than a paradox if a community which spent large sums upon art education should itself erect unworthy buildings. The possibility was considered of appointing, in connexion with the First Commissionership of Public Works and Buildings, an advisory council of leading architects, chosen on representative lines; and attention was called to the fact that at least since 1885 no member of the Birmingham City Council was in the municipal diary described as an architect. Birmingham did not stand alone in this matter, which was noticeable in view of the development of local duties, and of their interest and importance to architects. In conclusion the lecturer summarised the work of the Municipal School of Art. A hearty vote of thanks was passed to him on the motion of the President (Mr. William Henman), seconded by Mr. H. T. Buckland, and supported by Mr. W. H. Bidlake, M.A.

LIVERPOOL ARCHITECTURAL SOCIETY.—The fourth ordinary meeting of the forty-ninth session of this Society was held at the Law Library, Union-court, on the 11th inst., when a paper was read by Mr. C. E. Mumford on "Belgian Churches." Mr. George Bradbury, President of the Society, presided. Mr. Mumford, in his opening remarks, said Belgium was without doubt one of the countries of Europe where the fine arts have flourished and are still flourishing with the utmost vigour. The long series of great painters who succeeded each other for more than four centuries had not alone brought her the renown which she so justly enjoys; architects and sculptors had contributed their part. The devotion and intellectual culture of the Flemings had been shown in the vast number of churches of high architectural merit which are to be found in the country. Few of the older buildings now in existence date back beyond the beginning of the thirteenth century. It was not until the Gothic style was firmly rooted in the adjacent countries that it came to be adopted by the Flemings. All the vast wealth of ornament accumulated in these churches up to the middle of the sixteenth century was destroyed by the Calvinist iconoclasts, and there perished a wealth of art the loss of which was irreparable. About the commencement of the seventeenth century, the country again becoming prosperous, art and architecture received a new impetus, and many new churches were erected. The builders of Belgian churches, whilst striving successfully after the beautiful, always kept the practical utility of their work well in view. About 150 lantern slides were shown on the screen.

GLASGOW ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held on the 5th inst., Mr. Wm. Tait Conner in the chair, when Mr. W. J. Blaine read a paper entitled, "Some Scotch Houses." The lecturer limited himself to the consideration of four of the finest and most characteristic examples of Scottish castellated architecture—Crathes, Craigievar, Midmar, and Castle Fraser, all situated within a short circular tour from Aberdeen. Mr. Blaine took into consideration only the original castles or keeps, which in date lap from the latter half of the sixteenth century into the first half of the seventeenth century, leaving out the later wings, and, after describing the natural surroundings, gave an account of their individual history; then entering into a critical analysis of the principles of design they illustrate. Comparing the one with the other, he pointed out their strong and weak points, making this clear by diagram sketches and photos, the former of which he referred to as also exemplifying a theory of his, that the size of a building appears on a drawing in inverse ratio to its size in reality. In summing up, the lecturer placed these four buildings and their characteristics in the following order of merit:—Crathes, dignity with beauty of detail; Castle Fraser, beauty of detail with dignity; Midmar, dignity without beauty of detail; Craigievar, beauty of detail without dignity.

THE SURVEYORS' INSTITUTION.

MR. HOWARD MARTIN read a paper "On the Future Development of the Surveyors' Institution" at the temporary premises of the Institution, Savoy-street, Strand, on Monday. The chair was taken by the President, Mr. Daniel Watney. Mr. Martin, after referring to the history of the Institution since its formation in 1868, and the progress it had made, said its members were now spread over the whole country. With regard to another institution which he named, he said there was little done for its country members; but as to the country members of the Surveyors' Institution, they were charged somewhat lower fees, and had all the advantages of the Institution in London. While this was so, however, they laboured under the disadvantage in reference to the obtaining of information, their means being limited to their own circle of influence. He proposed, first, that provincial libraries should be established; and secondly, that meetings should be held taking the provincial centres in rotation. By these means the provincials would be kept posted up, and an increased interest in the Institution promoted. A vote of thanks to the lecturer was proposed and carried, and the discussion was adjourned.

Books.

A Wandering Scholar in the Levant. By DAVID G. HOGARTH. London; John Murray; 1896.

THIS is a very pleasant little book of impressions of travel, partly archæological but more especially concerned with the record of the general aspect of a country and of its inhabitants, and touched with the scholarly tone and literary style which the wording of the title seems to promise. There is not much in it that is of directly archæological interest, and the book is rather suggestive than didactic. The reader about to explore for antiquities may indeed obtain useful hints as well as amusement from the records of dealings with the native intellect when in search of such things as inscribed stones; how slow is the peasant to realise that a stone which he has been familiar with all his life is the thing the *gidur* wishes to see, or to convince himself that it is his interest to show it; how the price of the Bor stone fell, under judicious diplomacy, from 500 liras to 20; and how a Government Secretary promised that if there were any difficulty about the conveyance of the stone, "he could arrange that we should be robbed of it outside the town, and for a slight consideration recover it at the port." The following picturesque passage describes the impression produced when the explorer in Anatolia "breaks into some hidden hollow of the hills and sees grey among the lentisks the stones of a dead town":—

"Such fairy-cities are the nameless pirate-towns that were built on the Cilician slopes in the first two centuries before the Christian era. Water, no longer guided by man through long ducts, has failed on the high lands, and the region remains as it was left two thousand years ago, a vast Pompeii, where no man has rebuilt or destroyed. In its capitol, Olba, citadel, walls, streets and roads are choked with brushwood. A triple arch leads into the Forum; on the left the façade of a Temple of Fortune stands in the brake, and in front rise the fluted columns of the Olbian Zeus, whose priests were kings. Passing a ruined portico, the explorer lights suddenly on a theatre lined with vegetation sprouting from every crevice in auditorium and scene. But nothing in the city is more wonderful than the road leading from it to the coast. Mile after mile its embanked pavement runs over the naked rocks; mile after mile stones, fallen or standing, inscribed with the titles of Roman Emperors, record your progress; here you pass a group of tombs, there clatter through an ancient village, and at last wind down sweeping curves to the sea, past towers and tombs rising white out of the scrub; and nowhere in the towers or the villages, on the road or in the city is there a human thing except the wandering shepherds."

Theatre Panics and their Cure. London: B. T. Batsford. Edinburgh: A. Eliot. 1896.

"THEATRE Panics and their Cure" is the title of a small pamphlet which has been issued together with some plans claiming to illustrate a safe theatre. We regret that the efforts, no doubt well meant, of the authors of the pamphlet and the drawings are about fifteen years too late in the date of their publication. Instead of aiming at clear and straightforward planning with roomy staircases, which is the essence of safety for an audience, they try innumerable make-shifts, among which the most noticeable are the galleries running round the theatre at each tier. Such make-shifts remind one of those first proposed during the period of panic legislation after the "Ring" Theatre and Nice Opera House calamities, and do not speak well either for the authors' reading or practical experience. The proposed galleries and the special emergency staircases leading from them take up far more space on the superficial area than well-planned and roomy staircases and passages would have required. It is absolutely wrong to lay stress on "emergency" exits, as it is a well-known fact that an audience will always make for the exits which served as entrances when they approached their seats. The very terms "emergency" exit and "emergency" staircase should be cancelled from the vocabulary of theatre architects, as far as the safety of the public is concerned. It should be their ambition on the other hand to obtain clear and straightforward approaches without any complications whatever, and the maximum of symmetry in the disposition of doors and stairs on either side of the house. The idea of the emergency galleries, we should add, has been already carried out in the "Flemish" Theatre at Brussels, erected in the year 1887. We regret that the labour which has evidently been employed in preparing the drawings should have been so misapplied.

Gothic Wood-carving: being a Series of Drawings from the original work chiefly of the Fourteenth and Fifteenth Centuries. With explanatory Notes. By FRANKLYN A. CRALLAN. London: B. T. Batsford. 1896.

Is there going to be a revival of the Gothic revival? Mr. Crallan's book would suggest the idea, for his large lithographed drawings of Gothic woodwork finials, bench-ends, &c., well selected and very well executed, form exactly the kind of illustrations which used to be published forty or fifty years ago; they remind us of the days of "Brandon's Analysis" and other such standard books. Mr. Crallan, who has been instructor in wood carving at the Municipal Technical College at Derby, says that his intention in the book was to re-awaken an interest in a branch of art which had languished for many years. Whether he means Gothic art in general or Gothic wood-carving in particular is not very clear; if the former, he must have lived rather apart from the movement of the day to have been taken by surprise with the discovery that Gothic art had dropped very much out of practice for a good while past. For one professed object of the book, the desire to furnish models or suggestions for carving classes which could be formed to beautify their local churches with carving in the same spirit as Mediæval work, the book is well adapted, the examples being carefully drawn to a large size. And although the passion for Gothic detail which belonged to the revival has died out, people will still want good drawings of it, and they will find here one class of work well illustrated.

Correspondence.

To the Editor of THE BUILDER.

COPPER ROOFS.

SIR,—In case you receive no replies more to the point, I may cite, in response to Mr. C. J. Ferguson's letter in the *Builder* of last week:—

1. The dome of St. Joseph's, Highgate Hill, the Church of the Passionists, which, when I saw it last, in August, was light green in colour. The church, opened November 22, 1889, is described in the *Builder* of November 30, 1889. The architect was Mr. Albert Vicars, then of Somerset-chambers, Strand.

2. The spire, covered in 1784, of Hampstead Parish Church, 1747.

3. Mr. Ewart's lecture on "Roof Coverings," read before the Architectural Association on November 6 last, and reported in the *Builder*, November 21 last. Mr. Ewart mentions, for its colour, Hampstead spire; and (in his reply after the discussion on his paper) the roof of York Minster for its colour.

4. If my memory serves me—the spire of St. Mary's Parish Church, Battersea. D.M.

The Student's Column.

SPECIFICATIONS.—III.

BRICKLAYER.

THIS is one of the easiest trades for which to write a specification, but, at the same time care must be taken not to indulge too much in generalities, to which the work of this trade particularly lends itself. As before premised, begin with the materials, and follow up with the various kinds of work, thus:—

Bricks.—The bricks for walling to be approved, sound, hard, well burned, whole stocks and no bats are to be used except where legitimately required for bond. The bricks for facing to external walls to be Fareham first quality red facing bricks of a tint to be approved by the architect. (If varieties of bricks are to be used for various parts of the building, these must, of course, be here specified.)

Lime.—The lime to be freshly burnt blue lias lime of approved quality. (If grey chalk, Dorking, Merstham, selinitic or other lime is required, state so.)

Sand.—The sand to be clean, sharp river sand from above bridge, of medium coarseness and approved quality (or pit or sea sand if desired or allowed).

Cement.—The cement to be Portland cement of Messrs I. C. Johnson & Co.'s (or other selected firm) manufacture, to weigh not less than 112 lbs. (or upwards, if a slow-setting, heavy cement is wanted) per striked bushel, and ground sufficiently fine to pass 90 per cent. through a sieve of 2,500 meshes to the square inch, and to bear a tensile strain of not less than 300 lbs. (or up to 450 lbs. if very high quality) on the square inch of a briquette seven days old kept under water.

Mortar.—The mortar to be compose of 1 part of lime to 3 parts of sand, to be mixed in a pug mill and prepared in quantities sufficient only for one day's consumption. Cement mortar to be prepared as required in small quantities, and to be mixed in the proportion of 1 part of cement to 2 parts of sand.

Brick Walls.—Build all walls throughout of the various heights and thicknesses shown and figured on the drawings, with all the projections, recesses, openings, &c., shown, in their proper positions. The footings of all walls to be of the number of courses shown (or of the number of courses required by the London Building Act, 1894, or by the local by-laws), each course projecting 2¼ ins. beyond the face of wall or footing immediately above same. To be built perfectly level, not to rake with the ground, but to be stepped up where the levels vary, as may be directed by the architect. The drawings show, and the contract includes, an uniform depth of brickwork (7 ft.) to bottom of footings from the ground floor level, but the contractor is to follow the instructions of the architect as to the precise level at which the brickwork is to commence after the foundations have been approved by the architect.

The brickwork is to be carried up in level courses in English bond with buttered joints, and each course well flushed up. (Buttered joints are better than grouting unless this latter is done in liquid cement, and even then may be reasonably preferred.) No portions of walls to exceed 3 ft. above the adjoining parts whilst being built, and to be racked back and not toothed up. All bricks laid in dry weather to be well soaked previous to being used. No four courses to rise more than 1 in. (or 1½ in.) in addition to the thickness of the bricks laid without mortar.

Brickwork in Cement. — All brickwork in chimney stacks above roof level, all brickwork erected as piers standing alone, and such parts of the walls as are shown hatched on plans to be built in cement mortar. The half-brick walls to be built wholly in stretchers and in cement mortar.

Hollow Walls.—(If these are intended specify thus). The hollow walls shown on plans to be built in two thicknesses, 9 in. internal, and 4½ in. external, with a 2½ in. cavity, bonded together with wrought-iron ties, dipped in tar and sanded, every (18 in. to 3 ft.) in height and 2 ft. 3 in. (18 in. or 3 ft.) apart. The hollow and ties to be kept free of mortar droppings by haybands to be lifted as work proceeds. The damp course to hollow walls to be laid at two levels, that over inner thickness one course above that over remainder. The perpends of bottom course to be left open. Build in for ventilation of cavity (if this is desired and it keeps cavity drier) 9 in. by 3 in. terra-cotta air bricks, 3 ft. apart at bottom of cavity, and also immediately under eaves. All door and window openings in hollow walls to have immediately over arches an apron of 5 lbs. lead projecting ½ in. from face of wall extending through outer thickness, across space, turned up 2 in. against inner thickness, and extending 9 in. each way beyond frame. The perpends of course immediately over these aprons to be left open.

Facings and Pointing.—The facings to be carried out in English bond, the perpends carefully kept, and the joints pointed at completion with a neat struck weather joint in grey tinted mortar (or as may be desired. If diaper work is intended or ornamental bonding, describe it thus). The diaper work shown on south elevation to be executed in cross bond (or Flemish, &c.) with the pattern in black header bricks from Sussex. No staining or colouring is on any account to be applied to any brickwork, and the brickwork is not to be rubbed down before pointing, but washed only with a weak solution of green copperas. (State if work in cement is to be pointed in cement, or if joints are to be raked out and pointed to match facings.)

The inner faces of walls where plastered to be left with rough joints, as key for plaster, and in other cases to be worked fair with flush joints and twice limewhited (or dinged with a wet brush and distempered to an approved tint).

Gauged work.—(Refer to the parts where this occurs.) The . . . to be executed in gauged work with Lawrence's orange-red rubbers (or Suffolks, &c.), the moulded work to be carefully cut and rubbed to the architect's full size details. The gauged work to be set in lime putty, with ⅛ in. joints, and each course of plain wall to range with a course of the backing. (If there is carving the rubbers are sometimes set in shellac. If this is desired say so.)

Arches.—The external arches on front elevation to be executed in gauged work; the remainder to be fair axed arches. The arches to fireplace openings to have two half-brick rings in cement, and wrought-iron chimney bars, 1½ in. by ⅜ in., each 18 in. longer than openings, split and turned up and down at ends. The trimmer arches to be half-brick in cement rampant arches, to avoid the use of feather-edged springers.

Chimneys.—The kitchen flue to be 14 in. by 14 in., the remainder 14 in. by 9 in., all to be pargeted with cow-dung mortar, properly cored, and finished with Cooper's, of Maidenhead, red terra-cotta chimney pots, No. in list, p.c. each, to be bedded in brickwork for 9 in., and flaunched up in cement.

Hoop-iron Bond.—Lay throughout all walls under sills of first-floor windows a continuous range of hoop-iron bond, No. 15 gauge, 1½ in. wide, tarred and sanded, and laid in cement three courses in height, and one row to every half-brick in thickness of wall.

Moulded Strings, &c.—(Describe these, stating whether stock patterns are to be used; if so, refer to catalogue, and give price, or if to be purpose made to special full size details).

Plinths.—(Describe if of special brick, as salt-glazed, what the plinth course is to be, if plinth is to be battered, or any other special treatment.)

Damp-proof Course.—A damp-proof course of Val de Travers asphalte, ½ in. thick, is to be laid in all walls, and this work is to be executed by the company's workmen.

Air Bricks.—Build in where directed No. 60 red terra-cotta air gratings, 9 in. by 3 in., to ventilate floors and form proper splayed apertures for same, and render around in cement.

Copings. — (If brick copings are intended, describe them.) The coping to back wall of office building to be of brick on edge and double tile creasing, all set and pointed in cement.

Window Sills (if brick).—The window sills on first floor to be executed in splayed brick on edge, set and pointed in cement, with tile course under projecting ¾ in.

Pavings.—Pave the floor of scullery with 6-in. red Staffordshire tiles bedded and jointed in cement on 6-in. bed of Portland cement concrete. Pave the coal place with hard brick-on-edge paving set and jointed in mortar on a bed of sand 3 in. thick (or as desired). The kitchen yard to be laid with Jones's granolithic paving, 1½ in. thick, on a 4-in. bed of cement concrete, laid to current. The contractor is to lay the concrete bed after excavating the surface soil and filling in with

9-in. bed of dry brick rubbish, and the granolithic paving is to be laid by the patentee at the p.c. sum of 10s. per yard, which is to be paid to the patentee by the contractor within fourteen days after the production of the architect's certificate.

(Similarly describe any other pavings, asphalte, Staffordshire brick, or other material.)

Brick Steps.—(Describe these, if any.)

Boundary Walls.—Build garden fence walls on three sides of site, one brick thick, in Flemish garden wall bond fair on both sides, and finish with half round salt glazed brick coping, set and pointed in cement, with double tile creasing. These walls to be 6 ft. high above ground, and 1 ft. 6 below, with two courses of footings and 12 in. bed of concrete. Piers 18 in. by 18 in. to be built, every 10 ft. apart. Damp course of two courses of slate in cement to break joint.

OBITUARY.

HERR ENGELBERT PEIFFER.—Of eminent German sculptors deceased during the winter, we would notice the death of Herr Engelbert Peiffer, of Hamburg, whose work was well known throughout Northern Germany. He was the architectural sculptor who commonly had commissions from the leading German architects, such as Messrs. Ende and Boeckmann, of Berlin. He also sometimes practised as an architect, and in this capacity was associated with the well-known Hanseatic Building Company, which flourished between 1870 and 1880. He was exceedingly popular and much reputed for his talent in arranging special decorations on festive occasions—such as the visit of the Emperor to Hamburg in 1895—when he carried out the decoration of the Alster Lake and the artificial island which was constructed upon it.

DR. ALBERT ILG.—We regret to record the death of the well-known archæologist and art historian—Dr. Albert Ilg—one of the departmental chiefs of the Science and Art Museum at Vienna. Herr Ilg died at the early age of forty-nine, and has held offices as custodian in several important museums. He was well-known in archæological circles throughout the Continent, and was the author of several important works.

MR. W. T. ROBSON.—The death is announced of Mr. William T. Robson, of Grainger-street and Crossley-terrace, Newcastle, architect and surveyor, who died at Newcastle on the 11th inst. The deceased gentleman, who had been in an ailing state of health for some time, whilst walking along Newgate-street on the 9th inst. was seized with a fit, and was carried to the Infirmary, where he died at the age of 32.

GENERAL BUILDING NEWS.

SCHOOLS, GATESHEAD.—Two school buildings are in course of erection in Gateshead. On the Higher Grade School site, in Shipcote-lane, near Prince Consort-road, the new offices of the Gateshead School Board are being built, by Messrs. T. & R. Lamb, contractors, Gateshead, according to plans by Mr. Edwin Bowman, architect, Newcastle, and under the supervision of Mr. W. Edington, clerk of the works. The cost is not to exceed 3,500*l.* The building will be two stories high, and the board-room will be on the first floor, and will communicate with a members' room, and have adjacent a cloakroom and lavatory. The building will have brick walls with stone dressings and panels of carved stone. The roofs will be boarded and slated, and the walls and ceilings plastered. The other building is situated at Kell's-lane, Low Fell. There is accommodation for 880 children in the building. It is of two stories, and is planned on the central hall system, with class-rooms at the sides. Two staircase towers give access to the first floor, where there are several class-rooms. There is ample lavatory accommodation; and a gymnasium—about 87 ft. long—together with a cookery class-room, scullery, and manual instruction room, have been formed in the roof. The school is heated throughout with hot water. The material used in the building is brick, and the facings are of Foster's pressed red brick. Large covered playgrounds are provided for boys and girls. Mr. Joseph Elliot, of North Shields, is contractor, and the work has been planned and supervised by Messrs. Oliver & Leeson, architects, Newcastle.

TECHNICAL SCHOOL, DUDLEY.—On the 5th inst. the new Technical School in Stafford-street, Dudley, was formally opened. The Town Council having purchased the Stafford-street school, structural alterations were carried out by Messrs. Webb & Round, in order to adapt the premises for technical school purposes. On the first floor there are a large lecture theatre (with a graduated raised floor, capable of accommodating 150 students), demonstrator's private room, chemical laboratory, stores, &c.; whilst on the ground-floor there are three class-rooms. The alterations have been carried out under the direction of the Borough Surveyor, Mr. J. Gammage.

BOARD SCHOOLS, MORLEY.—The new schools erected in Bridge-street, by the Morley School Board, were opened on the 1st inst. The accommodation, exclusive of central hall and cookery room, is for boys and girls 688, and infants 350; total, 1,038. The architect is Mr. G. A. Fox, of Dewsbury.

SCHOOL, THORNLIEBANK, N.B.—Thornliebank Public School Buildings were declared open on the 5th inst. The plan of the reconstructed school is of the central hall type, with class-rooms grouped round, and the building being one story in height, all the rooms and corridors are on the same level. The main entrance for boys and girls fronts the public road; the infants enter at the west side, while the boys have also an exit to the east side. The basement is entirely set apart for boilers, heating apparatus, &c., while the ventilation is designed on the plenum system. Artificial light will be supplied by gas pendants fitted with incandescent lamps. The total cost is estimated at 10,000*l.* Mr. W. G. Rowan, Glasgow, is architect, Mr. A. B. Watson, measurer, and Messrs. Cameron & Dalglish, Thornliebank, builders.

POST OFFICE, HARROGATE.—The new post-office at Harrogate has just been opened. The architect is Mr. H. Tanner, of the Office of Works, and the style of the building is Perpendicular, freely treated. The post-office has been built of stone, with dressing of Pateley Bridge stone. The building was commenced on October 15, 1894, and has been erected at a cost of upwards of 9,000*l.* The new offices stand on a corner site at the junction of Chapel-street and Cambridge-road. The contractors were Messrs. William Ives & Son, of Shipley.

PREMISES, SCOTTISH WHOLESALE CO-OPERATIVE SOCIETY, GLASGOW.—The new premises of the Scottish Co-operative Wholesale Society in Morrison-street, Glasgow, which have been built at a cost of about 90,000*l.*, were opened recently. Situated on the south side of the Clyde, overlooking Kingston Dock, the new buildings are five stories in height, and cover about an acre of ground. The principal front to Morrison-street is 215 ft. long. The main pediment at the base of a tower is filled with emblematic sculpture. A round tower at the back of the pediment, 70 ft. high, is divided into bays by Ionic columns, and surmounted by a figure representing Light and Liberty, holding in her extended arm an electric light. The main entrance is by an ornamental wrought-iron gate in the centre division of Morrison-street front, and through a tower 150 ft. high into a vestibule, laid with mosaic and lined and panelled with Sicilian marble and Parian cement, and divided into bays by quarter pilasters and Ionic columns. Beyond this is a large entrance hall and staircase, and right and left from it corridors leading to the various sub-committee and buyers' rooms, thirty in number. The board-room is also on the ground floor; on the first floor are the cashiers' and auditors' departments, while the rest of the building is designed for warehouse purposes. The premises are illuminated by electric light. The work, with the exception of the sculpture, marble and mosaic, iron and glazing work, was done by artisans employed directly by the Society. The architects were Messrs. Bruce & Hay, Glasgow.

ST. KESSOG'S CHURCH, AUCHTERARDER, PERTH.—This church, the memorial stone of which has just been laid, is situated in a park of 2½ acres on the north side of the High-street of Auchterarder. The church consists of a nave, 48 ft. by 24 ft., and a chancel, 26 ft. by 24 ft., separated by a stone chancel arch, with carved capitals. The porch is at the south-west corner of the nave and in a niche above the doorway is a statue of St. Kessog. The vestries and organ chamber, with heating chamber underneath, are on the north side of the chancel. The chancel is the same width as the nave, and the roof is, externally, the same height in both, the ridging of red tiles being continuous from one end of the building to the other, except over the chancel arch, where it is intersected by the fleche. The fleche is of wood, covered, like the rest of the building, with green slates from Aberfoyle. It rises to a height of 70 ft. Externally and internally the walls are of warm red local stone, the dressings being in white stone from Auchinlea Quarries, near Motherwell. The roofs are of dressed timber, open to the ridge, 35 ft. above the floor of the nave. The nave is divided into four bays, and is lighted by groups of double lancets along the sides, and by triple traceried lancets in the west gable. The chancel is divided into two bays. The east window is placed high in the gable so to give space for a reredos over the altar. The altar and reredos are to be of stone, with marble columns, and the panels filled in with sacred subjects in mosaic. The altar is raised above the floor level of the nave by eight steps. On the south side of the sanctuary are placed the stone sedilia, piscina, and credence. The nave will accommodate nearly 200 persons. The architects are Messrs. Ross & Macbeth, of Inverness. The contractors are—Mason: Peter Anderson-Auchterarder; carpenter: James Martin, Auchterarder; slater: R. Gibson, Auchterarder; plumber: James Macleish, Perth; painter and glazier: C. Alexander, Perth.

NEW CHURCH OF ST. MARY MAGDALENE, ALSAGER, CHESHIRE.—This church is of the Decorated style and consists of a nave and chancel 26 ft. wide, north and south aisles opening into nave by arcades of five bays each, and organ chamber on the north side of the chancel, with choir and clergy vestries opening out of the same. The church will be entered at the west end by north and south porches, both of which open into the tower, which is 16 ft. square, and forms the baptistry. The tower will be surmounted by a spire. The total length of the church is 124 ft., and the width across the nave and aisles, 56 ft. The portion now carried out consists of the chancel, organ chamber, and vestries, the nave, with the south aisle and a portion of the north aisle, the south porch, and the lower portion of the tower to the level of the roof of the nave. The church is seated at present for 450, but will eventually accommodate 700 people. The cost of the present portion will exceed 8,000*l.*, an additional sum of 1,500*l.* being required to complete the tower and spire. The church is built of Alton stone throughout, the roofs, seats, and dados being of pitch-pine, and the chancel seats, altar rail and altar table of wainscot oak. The roofs of the nave and chancel are covered with red Staffordshire tiles, and of the aisles and porches with lead, the ceilings throughout being boarded. The heating is effected by hot-water pipes on the low-pressure system. The present contract has been executed by Mr. John Fielding, of Alton, and Messrs. Austin & Paley, of Lancaster, are the architects.

SCHOOLS, DONCASTER.—The new elementary schools connected with St. James's Church, at Doncaster, were opened recently by Mr. Ivatt, Great Northern Railway Chief Engineer and Locomotive Superintendent. On the site is a school providing accommodation for 310 girls, and at the junction of Stirling-street and Green Dyke-lane is a school providing accommodation for 352 boys. The girls' school has a clock tower and clock. The school buildings and fittings cost 4,500*l.* Messrs. Brundell, Simmons, & Brundell were the architects, and the builders were Messrs. Arnold & Sons, of Doncaster.

SCHOOL, ABERLOUR, N.B.—On the 5th inst. the new public school erected by the School Board of Aberlour was opened. The new school is situated opposite the Fleming Hall. Entering by the main door, which is at the west, the lobby, to the right and left of which there are teachers' retiring rooms, is reached, and it leads into the central hall, measuring 40 ft. by 27 ft. by 24 ft. high. From the hall the various classrooms are entered. Besides these, there are cloak and retiring rooms. Outside shelter sheds have been provided for boys and girls. The cost of the buildings is about 3,500*l.*, and they are built from plans supplied by Mr. Watt, Aberdeen.

SCHOOL, BLAISDON, GLOUCESTERSHIRE.—A new National school has been erected at Blaisdon. The schoolroom is 36 ft. by 18 ft. by 15 ft. high, the accommodation being for about ninety children. The work was entrusted to Messrs. King & Son, Gloucester, from designs of Mr. F. W. Waller.

SCHOOL EXTENSION, FARNDON, NOTTINGHAMSHIRE.—The foundation-stone of a new infants' class-room, with cloakroom attached, was laid on the 7th inst. at Farndon, near Newark. The building contract is in the hands of Mr. Fox, of Farndon, and the architects are Messrs. Sheppard & Harrison, of Newark.

THEATRE, LEEDS.—It is proposed to erect at Leeds, on the south side of the river, a new theatre, at the junction of Jack-lane and Meadow-road. The new theatre, which is to be called the "Victoria," has been designed by Mr. William Smelt, architect, Newcastle, assisted by Mr. F. W. Rhodes, architect, Upper Wortley. It is proposed that the front of the building should be of red Ruabon bricks, relieved by stone and terra cotta dressings. The front is on a curve, which is broken up into sections by pilasters with ornamental bases and caps. There will be four lock-up shops each 14 ft. 6 in. in height. Seating accommodation will be provided in the theatre for over 3,200 persons. The pit, which will be 60 ft. by 76 ft., will seat 1,300, and in the stalls there will be accommodation for 130. In the circle there will be seats for 480, and the gallery will seat the same number of persons as the pit. There will also be six stage boxes. From the pit three exits will be constructed, on a level with and leading directly into the street. The gallery will have two exits. The circle will be approached by a marble staircase, at the top of which there will be a large crush room. Behind the circle a refreshment saloon will be placed, 28 ft. by 18 ft., and 15 ft. in height. Ladies' and gentlemen's cloak rooms will also be provided. In connexion with the pit there will be another refreshment saloon, 28 ft. by 19 ft., and 15 ft. in height. The stage portion of the building will be 62 ft. by 36 ft., and 48 ft. to the grid. The proscenium front will be 32 ft. wide and 31 ft. high. The stage will be separated from the auditorium by a fireproof curtain, and it is intended that the building should be fireproof. The estimated cost is about 15,000*l.*

PROPOSED THEATRE, SMETHWICK.—It is proposed to erect a theatre in Rolfe-street, Smethwick, at a cost of 8,000*l.* The building will cover a site of 1,500 square yards, and afford sitting accommodation for 2,300 persons. The principal entrances will be in Rolfe-street, the galleries being approached from a side-road. There will be four staircases from the gallery, including an outside iron escape staircase for use in case of panic. The stage will be 63 ft. by 44 ft. The structure is to be made as nearly fireproof as possible, and will be lighted by electricity. An ornamental iron verandah will extend over the footpath the whole length of the building. Messrs. Owen & Ward, of Birmingham, are the architects, and Messrs. J. Harley & Son, of Smethwick, the contractors.

NEW PREMISES, LANCASHIRE INSURANCE COMPANY, GLASGOW.—On the 7th inst., the memorial stone was laid of the range of buildings erected by the Lancashire Insurance Company, Glasgow. The structure has a frontage of 60 ft. 9 in. to West George-street, and of 108 ft. 9 in. to Renfield-street. It is five stories in height, with a basement and attic floor, and on the Renfield-street frontage there is an entresol. The Company's offices will occupy the ground floor in West George-street, with a central portico for the entrance, surmounted by the arms of the company. The other portions of the buildings will be occupied as shops and business chambers, and will be provided with a passenger hydraulic lift for the whole of the upper flats, entering from West George-street. The stone used is red freestone from Locharbriggs Quarry, near Dumfries. The architect is Mr. J. Thomson, of Glasgow.

POLICE-STATION, GARDENSTOWN, BANFF.—The new police-station at Gardenstown is now almost completed. The contractors for the work were:—Mason, Mr. R. Morrison, Macduff; carpenter, Mr. John Gordon, Macduff; plasterer, Mr. Gibson, Banff; slater, Mr. Liddel, Macduff; plumber, Mr. A. Strachan, Banff; and painter, Mr. Forbes Watt, Banff. The architect was Mr. M'William, Portsoy.

TECHNICAL SCHOOLS AND PUBLIC LIBRARY, LONGTON.—The foundation-stone of these schools was laid on the 17th inst. "with Masonic honours," before a large number of spectators assembled in a tent specially erected. The Prince of Wales, as Grand Master, laid the stone with the usual formalities, the Borough Surveyor representing the architect, who is in fact not yet selected, no design having yet been selected from the competition drawings sent in, so that the ceremonial seems to have been a little premature.

PROPOSED PUBLIC HALL, TEIGNMOUTH.—A meeting was held at Teignmouth on the 9th inst. to consider the question of the erection of a public hall. Mr. J. Watson, architect, Torquay, presented plans, and it was resolved that a site be secured and a hall erected provided the necessary capital was forthcoming, and that alternative plans be produced at the next meeting.

TOWER, WEST RIDING COUNTY OFFICES.—Some months ago Messrs. Gibson & Russell, London, the architects for the County Council Offices at Wakefield, suggested that the tower should be heightened, but the General Purposes Committee at that time were not satisfied that the heightening was necessary. The architects, however, again brought forward the subject, and furnished perspective drawings showing the appearance of the tower as it will actually present itself from various points of view. By the instructions of the Chairman of the County Council and the Chairman of the Committee, the designs and perspective sketches showing the tower as originally designed and as proposed to be heightened were submitted to the Royal Institute of British Architects with the object of eliciting their opinion. The Institute expressed the view that the County Council should take the advice of their architects in the matter. The Committee, after very careful consideration, have satisfied themselves that the appearance of the tower will be very disappointing, owing to the fore-shortening, unless it is heightened in accordance with the architects' proposal, and they recommend the County Council to grant 651*l.* 13s. 4d. for carrying out the work.—*Leeds Mercury.*

EXTENSION OF ECCLES TOWN HALL.—At the last monthly meeting of the Eccles Town Council, Councillor Oldfield moved, and Councillor Mort seconded, the adoption of the minutes of the Town Hall Committee, which included a resolution approving of revised plans prepared by Mr. Bagot, architect, for the proposed extension of the Town Hall at an estimated cost of 4,500*l.* The original estimate, prepared by the Borough Surveyor, was 3,500*l.*, but this amount did not include all the work contained in the plans of the architect. Councillor F. Smith suggested that other plans should be obtained before powers to borrow the money were applied for. Alderman Parr agreed that it would be well to have competitive plans for the work of extension. The proceedings of the Committee were adopted.

SANITARY AND ENGINEERING NEWS.

BIDEFORD OLD BRIDGE.—During recent years Bideford and district have developed rapidly, until the bridge which has provided passage over the Torridge for centuries is totally inadequate for present requirements. For a long time the Bridge Feoffees have recognised this fact, and at last called in Mr. C. E. Ware, M.Inst.C.E., of Exeter, to survey the ancient structure and formulate a scheme, or schemes, for widening and strengthening it. He has now sent in plans of four schemes, all of which provide for a widening of the bridge to 35 ft. (inclusive of pathways). Each scheme provides for the rounding off of the bridge at the western side—a much-needed improvement—and the lowest estimated cost of the alteration is 9,851*l.*, while the highest is 17,976*l.* From a sentimental point of view, it is to be regretted that the "four and twenty arches" immortalised by Kingsley are proposed to be reduced, but doubtless the exigencies of the case demand it. On one of the plans the number of arches appears to be eleven, and on another twelve.—*Western Morning News.*

REFUSE DESTRUCTION, HANDSWORTH, BIRMINGHAM.—A Local Government Board inquiry was held at the Council House, Handsworth, on the 6th inst., concerning the application of the District Council for permission to borrow 8,500*l.* for the purpose of erecting a refuse-destructor for the district. Mr. F. H. Tulloch, M.Inst.C.E., was the inspector appointed to hold the inquiry. The Clerk to the Council (Mr. H. Ward) explained that it was desired to build an eight-cell destructor, with a chimney-stack 200 ft. high, with boilers and the necessary buildings, including a couple of cottages in Queen's Head-lane, Handsworth. Mr. E. Kenworthy, Surveyor to the Council, explained the details of the scheme. He added that an eight-cell destructor would be sufficient to meet the needs of the district for the next eight or ten years at least.

WATER SUPPLY, LERWICK, SHETLAND.—At the monthly meeting of the Burgh Commissioners of Lerwick recently, plans of a proposed new water scheme, which has been prepared by Messrs. C. & A. Leslie & Reid, Edinburgh, were submitted. The new scheme provides for the erection of three new filters and two large settling ponds, also the laying down of an additional six-inch main and other necessary works. The cost of the whole works was estimated at nearly 4,000*l.* It was resolved to approve of the plans with some modifications.

PROPOSED STREET IMPROVEMENTS, WARRINGTON.—On the 8th inst., at the Town Hall, Warrington, Colonel W. Langton Coke, M.Inst.C.E., conducted an inquiry on behalf of the Local Government Board in connexion with the application of the Warrington Corporation to borrow 43,731*l.* for the purpose of street improvements. There were present the Mayor (Alderman Fairclough), Mr. J. L. Whittle (Town Clerk), Mr. Longden (Borough Surveyor), and other officials and members of the Corporation.

ELECTRIC LIGHTING NEWS.

ELECTRIC LIGHTING OF STIRLING.—The report of Professor Kennedy, of London, the expert consulted by the Stirling Police Commissioners as to the introduction of the electric light into the burgh, has just been received. The report shows generally that the aggregate cost of lighting the compulsory area—Port-street, King-street, and Murray-place—would be about 15,000*l.*, but Professor Kennedy recommends that plant should also be put down for lighting the residential part of the town, which would bring the total cost to from 20,000*l.* to 22,000*l.*

STAINED GLASS AND DECORATION.

WINDOWS, STONY STRATFORD PARISH CHURCH.—A series of six three-light windows has recently been filled with stained glass in this church, the subjects of which form a complete scheme. The first and last were offerings of Mr. E. Swinfen Harris, architect, in memory of his father and mother, the former one having three types of "Duty":—(1) "Our Lord and St. Joseph in the Carpenter's Shop at Nazareth," (2) "Joseph Distributing Corn to his Brethren," (3) "St. Joseph of Arimathæa Begging Our Lord's Body"; the latter having:—(1) "Our Lord and Nathanael," (2) "Jacob's Dream," (3) "Jacob Blessing the Sons of Joseph." The whole series were designed by Mr. N. H. J. Westlake, and are the work of Messrs. Lavers & Westlake. They are a good example of two essential points needful to the success of painted glass—all being the work of one hand and one "colour scheme," and all following a prearranged Bible story.

WINDOWS, ST. MARGARET'S CHURCH, BURTON-ON-TRENT.—The clearstory windows of St. Margaret's Church have been filled on the south and west sides with stained glass. The old glass taken out of the north and south transept windows of St. Paul's Church has been adapted and improved by new borders and fillings-in by Messrs. Burlison & Grylls, of London. There are now fifteen of the windows filled with stained glass.

FOREIGN.

FRANCE.—The medal granted annually by the Société Centrale des Architectes to the architectural pupil who has gained the greatest number of "recompenses" at the Ecole des Beaux-Arts, has been awarded this year to M. Gustave Umbdenstock and M. John Van Pelt.——The election for the remodelling of the committee of the *Société des Artistes Francais* for the years 1897, 1898, 1899, has just taken place at the Palais de l'Industrie. The results in the Architectural Department are as follows:—MM. Loviot, Garnier, Daumet, Laloux, A. Normand, Pascal, Raulin, Ginain, Coquart, and Redon.—— Last week, for one day only, the public were admitted into the Boussod and Valladon Gallery (late Maison Goupil) to view a large water-colour painting by M. Edouard Detaille, which is to be offered to the Russian Sovereigns. It was ordered by the Franco-Russian Syndicate. The picture represents the Imperial procession passing the troops which are collected in the plain of Châlons-sur-Marne. The moment chosen is when the Tsar is passing the flag of the Chasseurs-à-pied, and saluting it, at his right is the carriage containing the Empress, with M. Félix Faure at her side, at the end of the picture are the African and Arabian troops. The details are done with the utmost precision and with an ingenuous fidelity, which redeems it from the ordinary modern historical painting, but it is entirely wanting in anything like poetry or sentiment.——The Administration des Voiries are now preparing a new regulation. The projections in front of the doors will in future be regulated by the width of the road in which the house is situated.—— The Femmes Artistes have just opened their fifth exhibition in the Georges Petit Gallery, where several pictures of real merit are drowned in the mass of mediocre works. We may mention the landscapes of Mme. Brouardel, the flowers of Mmes. Muraton, Foyot, and Louise Desbordes, and the miniatures of Mme. Isbert.——In the Durand Ruel Gallery is an exhibition of Francs-Comtois artists.——The sculptor Injalbert has been commissioned to execute the monument which is to be erected at Sceaux in memory of the poet, Paul Arêne, who has recently died.——The Society of Civil Engineers has been authorised by the Government to erect at the junction of the Boulevard Peréire and Rue Alphonse de Neuville and Verniquet, the commemorative monument to the engineer Eugène Flachat, who made the Ceinture railway. This monument is composed of a bust of Flachat, the work of Alfred Boucher, placed on a pedestal by the architect, Gaston Trélat, and ornamented with basreliefs.——M. Chaplain, Member of the Institute, has just finished the model of the new gold coins which are to be circulated at the end of 1897.——M. Platel has been elected President of the new Société des Architects du Hâvre.——M. Geay has been elected Honorary President of the Société des Architects du Limousin, the acting President of which is M. Dubet, architect at Perigueux.——A competition has been opened at Châlon-sur-Saône for the making of a public garden in this town. The prize has been awarded to MM. Latour, architect at Châlon-sur-Saône, and Redont, architect at Reims.——The death of M. Eugène Maron is announced. He left a "Histoire de l'Art à Travers les Ages," at which he had been working twenty years, and fragments of which were published in the magazine *L'Art.*——The death is also announced, in Indo-China, of an architect of talent, M. Autoiné Garnier, inspector of *batiments civils* at Puôm-Penh (Cambodia). Born at Lyons in 1859, M. Garnier studied in the Pascal studio. He went to Indo-China in 1895, where he shared in the building of many buildings lately erected in the Protectorate—hospitals, custom houses, and houses for French residents in the province.

GERMANY.—We have frequently given some data as to the enormous change by tenants of their residences that takes place at Berlin. It is interesting to observe that at October quarter-day last over 100,000 tenants changed their residences.——We understand from the *Deutsche Bauzeitung* of December 30, 1896, that there are sixteen candidates for the annual Schinkel Studentship, which is a larger number than is usually the case.——The idea of giving Berlin an Artists' Home or Club seems to be finding considerable favour, and we understand that a competition was opened some time back for designs to remodel an old building, which we believe to have been bought by the Berlin "Society of Artists."——The Hamburg municipal authorities have arranged a course of public lectures for this winter on subjects relating to building and public works, more especially in connexion with those of that city. This is one of the first instances in which a German municipality has undertaken to arrange lectures for the public of this kind.——Of the many competitions which are being held for designs of bridges, there is one for a bridge over the Elbe at Harburg, where premiums to the amount of 900*l.* have been offered. The competition will be decided during February, and among the assessors is the City Architect of Hamburg.——We understand that the Prussian Government has been giving some attention to the question of scavenging, and has made a grant of 250*l.* to one of the societies interested in this subject, which is to be given as a premium for the best proposed method of cleansing a small town.——Perhaps one of the most important private theatrical enterprises which has yet been carried out in Germany has lately been executed at Munich, where a new "German" theatre and casino has just been erected as a speculation. The theatre contains accommodation for 2,000 persons, whilst the casino includes a large restaurant, club rooms, assembly rooms, billiard rooms, &c. Herr Alexander Bluhm acted both as architect and contractor for the work, but was assisted by a number of prominent specialists, including Herr Lautenschlaeger, of Munich, for the stage fittings, Herr Wagner and Herr Kramer for the decorations. There appears to be the possibility of combining the theatre, the assembly rooms and the club rooms for special festive occasions, when accommodation could be found for altogether 6,000 visitors. There are a number of tenements and shops in connexion with the block.——Of other theatres lately opened in Germany, Bromberg has been given a municipal playhouse costing 22,000*l.*, with accommodation for an audience of 800 persons. Herr

Heinrich Seeling, of Berlin, was the architect; he has practically become the theatre specialist of Germany, his principal theatres being the Municipal theatres at Halle, Essen, Rostock, and a private theatre at Berlin.——Besides the Bismarck monument at Berlin, memorials to Bismarck are to be erected at Dresden and at Magdebourg. As is customary in Germany, competitions were opened for the design in both cases.——The present year, it appears, will again be associated with numerous industrial exhibitions on the Continent, and of these, perhaps one of the most important will be the forthcoming exhibition at Leipzig, which will be opened early in the summer. The situation of the exhibition has been well chosen on a wide and undulating site near the Johanna Park, and the general plan was the subject of a competition.

NORWAY AND SWEDEN.—At Stockholm there is to be an important competition for the design for a central railway station, at which premiums of approximately 700*l.*, 450*l.*, and 225*l.* are offered. The competition is an international one, and, hence, architects of all countries are free to enter, but particulars as to the details have not yet reached us.——We understand that the Government Office of Works at Christiania has opened an international competition for the design of a new railway station at Christiana, and has offered premiums of 10,000, 4,000, 2,000, and 1,000 kroners. Particulars can be obtained by applying to the Ministry, where the necessary site plans are provided on depositing 50 kroners. The sending in day is March 31, 1897. The requirements of the programme are such as to necessitate combined collaboration of an architect with a railway engineer, and they are by no means such as can be solved by an architect without special knowledge of railway matters. There will be a jury of assessors, comprising three laymen and four specialists; among the latter is Baurath Schwering of Berlin. We scarcely consider the jury sufficiently representative, either as regards the nature of the subject or its international importance.

RUSSIA.—A competition has been opened for a large hospital at Stawropol, in the Caucasus, for which the sending-in day is in April next. Of other competitions, we hear from St. Petersburg that the Trotting Association at Moscow has opened an international competition for a grand stand for three thousand spectators, which is to be a substantial structure, and for which the cost is limited to 350,000 roubles—about 55,000*l.* This is an international competition; the premiums are of considerable value, and the designs will be assessed by a jury of fifteen, of whom six are laymen and the other nine architects. Particulars can be obtained from the Architectural Society at Moscow. We have had occasion to refer to the Theatre Competition which is being held at Kieff, and which may be considered an international one. Seeing the value of the premiums offered, we are much surprised to hear that there are only sixteen designs before the jury, and of these we understand that there are seven from St. Petersburg, and of the nine strangers three are from Germany, two from France, one from Sweden, and one from Italy. We are indebted for this information to Professor Schroeter.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. H C. Eyres, London Agent of the Coalbrookdale Company, Limited, has resigned his position there and assumed the position of manager of the Architectural Department in London of the Falkirk Iron Company.——Mr. W. Galt Millar, architect and surveyor, Reading, has taken into partnership Mr. W. James Nasmyth, who will carry on business with him under the style of Millar and Nasmyth, at Reading and at 43, Cornmarket-street, Oxford, Mr. Nasmyth devoting his time exclusively to the interests of the Oxford branch.

TIMBER TRADE DURING THE PAST YEAR.—According to Messrs. Foy, Morgan, & Co.'s annual wood report for 1896, the past year has been exceptionally favourable for the timber trade, prices in almost all departments having slowly hardened from the commencement until the close of the season. The grounds for the satisfactory nature of last year's business and the increased cost of next season's supplies are practically the same, being quite general and not merely local. Among them, the most prominent have been, firstly, the unusually open weather last winter and spring, which permitted building operations to proceed uninterruptedly, stimulating consumption and leading to a considerable depletion of customary stocks throughout the country; secondly, the unexpectedly cheap freights ruling in the spring and summer, which allowed the gap in stocks here to be filled at an almost imperceptible increase in cost, thereby affording the merchants the opportunity, while the demand continued unabated, of an easy turnover at a profit somewhat more liberal than usual; and, finally, the sharp and totally unforeseen rise in autumn freights, which effectually prevented the impulse to import at a time when such additions to stocks were certain to become dangerous. As it is, the import during 1896 has expanded to an extent which in ordinary seasons must have led to a general collapse in prices, a result which has only been averted by the favourable conditions, already named, under which trade has been carried on. In regard to imports from various countries, the Board of Trade returns put the increase in the total import into the United Kingdom of sawn goods from Russia at 15 per cent. more than in the preceding year, but the surplus into London has been proportionately greater than this, being at least an additional 20 per cent. This surplus, moreover, has been drawn mainly, if not entirely, from the White Sea, Petersburg having contributed even less than usual to the London stocks. From Sweden there has been a further decline in the import of deals, and a corresponding increase in battens, accompanied also by a remarkable expansion in the flooring business. From Norway the import of planed goods has been of almost the same proportions as in the preceding year. Prices have improved continuously throughout the season, and a good market awaits those with unsold stock available for shipment during the winter and early spring. From Finland the import has not greatly varied from that in 1895. The market improvement was the speediest, and proportionately also the greatest, in the classes of goods in which this country is chiefly concerned—battens, and to some extent, flooring. From Canada the import of pine into London has again been considerable, and this, following on the excessive import in the preceding year, leaves us with a present stock considerably in excess of the probable requirements of the market, although the low standard of prices prevailing is perhaps the best guarantee for the continuance of the recent expansion in consumption. In spruce the import has been much larger than usual, but still not excessive. During the three previous years the import had fallen on an average to 7 or 8 per cent. below the annual consumption, leaving the stock in hand at the commencement of the present season one of the smallest on record. Even now, notwithstanding the fact that last year's import was actually greater than that of 1895 by about 40 per cent., the stock which remains is, owing to the large quantities which have passed into consumption, only slightly in excess of the average, although appearing unfavourably when compared with the exceptionally small stock of last year. Oak has been dull of sale all the year. The stock is now ample, having regard to the fitful nature of the demand. In elm the stock is not large, but there is little inquiry. Birch experienced a sudden revival in consequence of the advance last winter in the price of mahogany, as a cheap substitute for which it seemed to be suited. The import of both timber and deals, &c., has been larger than last year. The mahogany trade during the year now closing has been exceedingly satisfactory. During the first three months of the year prices slowly but surely advanced, after which they settled to a level which has been maintained with but slight variation ever since. In consequence of the somewhat limited supplies, a quantity of wood of poor quality and condition was sent in, which has resulted in the value of minimum wood slightly declining, but such imports have not been on a very large scale, and the market has not seriously suffered thereby. There has again been an increase in the importations of cedar to Europe, the figures being about 30 per cent. more than last year, but the character of the wood imported differs from that of 1895. The quantity from Cuba has dropped away to almost trifling proportions, while the shipments from Mexico and the West Coast of Central America have increased to a very considerable extent. A very important feature has been the enormous quantity of Cedar imported from Paraguay. There has been an excellent demand for greenheart timber throughout the year, and as supplies have come forward on a moderate scale prices have improved, and the market is now very firm. The outlook for 1897 is favourable, as it appears probable that the demand will quite keep pace with the importations. Of sequoia (Californian redwood), there having been no fresh arrivals for nearly two years, a cargo which came in during the autumn found the market almost bare of stock, and is consequently selling at good prices. The high price of mahogany has also helped materially to keep up value. In American black walnut logs of large size and of good quality and manufacture continue to fetch high prices. In American whitewood there is less demand for logs, and prices are low. Prices for both quartered and plain-sawn American oak have been fairly well maintained. In Australasian hardwoods kauri pine in planks has been in steady request throughout the year. For hardwoods for paving the demand in the London district during the year has been rather disappointing, but the consumption in the provinces has been more encouraging. For the first time for several years the supply of jarrah has been ample, and the stock is quite large enough to cover the probable requirements in this market for several months.

BY-LAWS AND BUILDINGS, BLACKPOOL.—At a meeting of the Blackpool Town Council on the 5th inst., Mr. Grime proposed that a committee of inquiry be appointed to take evidence and otherwise inquire into the administration of the building by-laws of the borough. Mr. Grime, in supporting his motion, said it was difficult to imagine that such an unsatisfactory state of affairs existed in the borough. Here they had the Medical Officer complaining that he and his department had no authority to insist upon the first elements of public health. Dwelling-houses, it was said, were frequently erected in violation of the very plans passed by the Corporation, and inhabited in spite of the protest of the Medical Officer regarding the insanitary condition of the building. The regulation that houses should not be occupied without a certificate was a delusion. They had the surveyor openly repudiating his responsibility for the carrying out of the by-law, and along with the Chairman of the Committee advocating the creation of a new authority apart from the Council to carry out the by-laws. Architects and builders were openly saying that they could not get equity and justice unless they had friends at court, whilst other builders openly flouted the by-laws when the plans had not been passed. He appealed to the Council to endeavour to wipe out one of the cankers of the public life of the town. Alderman Buckley seconded the motion. Mr. Dickenson, who defended the committee, said that no favour was shown. Mr. Holden mentioned instances of breaches of the by-laws. Mr. Brodie laid the blame on the magistrates, who never convicted, and said that in many cases magistrates were brought down specially to dismiss cases. The motion was carried by 11 votes to 3.

PULPIT FOR ST. MARY'S, ASHFORD.—A new pulpit is to be placed in St. Mary's Church, Ashford. The design is by Mr. J. L. Pearson, R.A.

BUILDING OFFICIALS AT BERLIN.—Amongst the most important changes contemplated in the official circles at Berlin, as far as the Commissioner of Works' office is concerned, we observe that Herr Hinckeldyn, who so ably presided at the Berlin Architectural Congress of 1896, is to fill the office of "Oberbaudirector." This is one of the highest appointments which a Prussian building official can obtain, and relates particularly to the architectural branch of the Department. Owing to the resignation of Herr "Baudirector" Wieber, who was specially connected with the survey sections of the Department, Herr Kummer has been appointed to this office. Both the new officials are very popular among Continental architects and engineers, and their appointments—which are dated from October 1, 1896—have, consequently, been very well received.

CENTRAL SCHOOL OF ARTS AND CRAFTS, REGENT-STREET.—This week work has recommenced at the new Central School of Arts and Crafts, which was opened in October last at 316, Regent-street, opposite the Polytechnic. The school has been established by the Technical Education Board of the London County Council, and is under the direction of the two art advisers of the Board, Mr. George Frampton, A.R.A., and Mr. W. R. Lethaby. The object of the school is to provide for artisans who are engaged in trades where artistic handicraft is required, a training both in the principles of artistic design and in the application of design to their specific industries. The teaching is throughout specially directed to the requirements of the trades in which the students are engaged, and the school is only open to those who are actually working at a trade. At present the school provides teaching mainly for those who are engaged in the silver trades, and in those branches of the building trade where artistic training is specially needed; but steps are being taken to provide for other trades, such as the gilding and the bookbinding trades, and it is not impossible that out of the nucleus which exists at the Regent-street school there may eventually grow a complete system of artistic and technical instruction which will ensure for the artisans of the Metropolis that sound and practical artistic training which they require to enable them to hold their own in the industrial struggle with foreign countries.

ROYAL VISIT TO TILE WORKS, STOKE-ON-TRENT.—During the recent Royal visit to Trentham Hall, the Princess of Wales visited the works of Messrs. W. T. Copeland & Sons, manufacturers of ceramic wares, Stoke-on-Trent. The Princess afterwards proceeded to the patent tile works of Messrs. Minton, Hollins, & Co., where they were received by Mr. J. B. Ashwell (Town Clerk of Stoke-on-Trent), who is the representative of Col. Hollins, and by Mr. Darlington, the manager. The Princess and party were first shown the method of tile-making by the dry dust process, after which the manufacture of tiles from plastic clay engaged attention. The show-room was subsequently inspected. An arrangement of tiles, similar to those supplied to form a dado at Appleton House for Princess Maud, was seen.

ARTIFICIAL ILLUMINATION.—Lecturing on this subject on Sunday afternoon last at St. George's Hall, Langham-place, Professor V. B. Lewes showed that, until the advent of the electric light, flame had no rival as a source of artificial illumination, and if we attempted to trace the genesis of our illuminants we found ourselves taken back to the days of the old Norsemen who, using branches of pinewood to cook the spoil of their hunters, noticed that as the fat melted and dropped upon the burning embers they blazed anew, and emitted far more light than when the wood burned alone; and the idea naturally arose of steeping the wood in heated fat before using it as a torch. They tried dipping thin pine rods into their fat pots, so building up a rough form of candle. They soon, however, found that the wood burnt far too slowly to keep pace with the fat, and at length

found that a core of the pith of rushes gave the best result, and thus was created the "rush-light," which played the part of illuminant and time-keeper to our Saxon ancestors, and which might even now be met with in some of the old-world villages where the inroads of modern improvements had not as yet reached. Flame was one of the chief manifestations of combustion, which was the generation of heat and light during intensely active chemical combination, usually that of the oxygen of the air with the combustible substance. Flame was burning gas, and hence the *combustible* must be a gas, or be capable of vaporisation. The terms "combustible" and "supporter of combustion" were purely relative, as a jet of air would burn as readily in an atmosphere of coal gas as a coal-gas jet would in air. Many theories had been advanced as to the cause of luminosity in flame, but the first and most generally accepted was the one enunciated by Sir Humphrey Davy, that when a gas containing carbonaceous material was burnt, the luminosity was due to the separation of minute carbon particles heated to incandescence by the combustion going on around them. A flame was generally considered to consist of three parts, the inner dark zone where the gases were subjected to a preliminary baking, the luminous zone in which the particles, after being separated were raised to incandescence and yielded the light, and a faint non-luminous zone, or mantle, to the flame where complete combustion was taking place. The luminosity of hydrocarbon flames was largely due to the gas acetylene, which contained twelve parts by weight of carbon to one of hydrogen. Acetylene was first isolated by Edmund Davy in 1836, but it was not till the last few years that a simple mode of manufacture had brought it within the range of commercial possibility. A Mr. T. L. Wilson devised a process for manufacturing aluminium by the electric furnace, and endeavouring to obtain the metal calcium in the same way, using lime in place of alumina, he obtained an extremely hard semi-crystalline body. Regarding this as useless, he threw it into the neighbouring stream, when an instant evolution of large quantities of gas attracted attention. The gas proved to be acetylene, and the solid obtained carbide of calcium. This gas, when consumed in burners of the proper kind, emitted a light fifteen to twenty times greater than that of ordinary coal-gas, and the ease of its production and its marvellous luminosity rendered this discovery one of the most interesting chapters in the history of artificial illumination.

BETHNAL GREEN MUSEUM.—We have received a copy of the catalogue of a collection of Oriental Porcelain lent to the Bethnal Green Museum by Sir A. Wollaston Franks, by whom, as we gather, the descriptive catalogue is written. The catalogue, studied with the collection, forms a most instructive analysis of the subject. It includes a special chapter on the marks on Continental Porcelain. We have also received the catalogue, by Mr. Hungerford Pollen, of the loan collection of English Furniture and Figured Silks at the same museum. Both are published by Messrs. Eyre & Spottiswoode.

PETERBOROUGH CATHEDRAL.—The following letter has been addressed by architects in Leicester to the Dean and Chapter of Peterborough: "We, the undersigned, architects and surveyors of Leicester (being the largest town in the diocese), having full confidence in the judgment of your architect, Mr. J. L. Pearson, R.A., and knowing from what he has done in the past that any work he does to the West Front of Peterborough Cathedral will be of the most reverent and conservative character, beg to forward a subscription of 71*l.* towards the fund you are raising for the restoration of this unique portion of the Cathedral of our diocese." The signatures of thirty-eight architects and surveyors of Leicester are appended.

ANTIQUARIAN DISCOVERIES IN CARLISLE.—An interesting discovery has just been made in the course of excavating for the foundations of some new buildings at the top of the east side of Botchergate. The find consists of an urn of plain pottery, nearly 3 in. in diameter on the base, and swelling out to a maximum diameter of 7 in. at a height of $3\frac{3}{4}$ in., after which it contracts. It now stands about 5 in. in height, but the upper portion, with the neck, is broken off and lost. Inside the urn was found the circular bottom, 3 in. in diameter, of another vessel of red clay, which had apparently been used as a lid. The urn was about half full of burnt and broken bones, from their size the bones of a child from four to six years old. With them was found a small grotesque figure, carved in bone, about 2 in. long; the figure of a man with a large [Roman] nose, in an extraordinary headdress, not unlike that of our present Highland regiments. The urn was not protected by any stone cist, or otherwise and the remains must be those of the cremated child of poor parents, who have placed in the funeral pile one of the child's juvenile toys, for the bone figure has also gone through the fire. The place where the find occurred is within the limits of the great Roman Cemetery at Carlisle, which extended, probably sparsley on either side of the London road from the Court Houses to Harraby Bridge. By the kindness of Mr. H, Davidson, the urn, with its contents, has been handed to Chancellor Ferguson, and will shortly be on exhibition in Tullie House.—*Carlisle Express.*

CAPITAL AND LABOUR.

WAGES IN THE BUILDING TRADE AT DARLINGTON.—On the 9th inst. a meeting of operative carpenters and joiners was held at the Raby Hotel, Darlington, to consider the question of wages. A resolution was passed that, in consequence of the much better state of trade in the town, and activity in the building department, the employers be given notice for an increase of 1d. per hour from January 19, such notice to expire on Easter Monday.

PAINTERS' WAGES, SUNDERLAND.—The members of the Master Painters' Association in Sunderland have received a demand from the men for an advance of wages. The present rate paid is 8d. per hour, and the demand is for a penny advance before March 1. Some 400 men will be affected.

LEGAL.

A BUILDER'S CLAIM FOR WORK:

ACTION IN THE QUEEN'S BENCH DIVISION.

THE case of Cole *v.* Boutall came before Mr. Justice Lawrance, in the Queen's Bench Division, on further consideration, on the 11th inst., the case having previously been before his Lordship at Winchester in June last, when it was arranged that the record should be withdrawn on terms to be agreed on, and with liberty to apply.

Mr. Giles, who appeared as counsel for the plaintiff, stated that as the parties had been unable to agree on the terms, it was necessary that the case should be heard by his Lordship. From the statement of the learned counsel, it appeared that the plaintiff, a builder, claimed from the defendant 181*l.* 12s., the balance of a sum he alleged to be due to him under the following circumstances:—The defendant had some property in the neighbourhood of Alton, in Hampshire, and was interested in some lithographic works there. The manager of the works, a Mr. Crampton, required a house to live in, and the defendant was tempted, by seeing some houses which were being built in the neighbourhood, to employ Messrs. Clarke & Shortt, architects, of Bournemouth, to build the house for him. The architects seemed to have heard of the matter from Mr. Crampton, and they made an offer to build a bungalow-house on the Beach-place Estate for 445*l.* That offer was accepted by the defendant, and the architects proceeded to find a contractor to carry out the work, and ultimately employed Cole, the plaintiff, a local builder, who undertook to build the house for 415*l.*, the difference being retained by the architects for their fees, &c. The question in dispute was whether there was a binding contract between the plaintiff and the defendant, Mr. Giles contending that the defendant having employed the architects to construct the house, they had authority to employ a contractor to carry out the work, and therefore authority to bind the defendant.

At the close of the plaintiff's case, Mr. Bullen submitted that judgment should be entered for the defendant, inasmuch as the plaintiff had failed to make out any case. The learned counsel said that he was ready to go through the documents in the case to show what his case was.

His Lordship replied that he had gone through all the documents that morning, and therefore it was not necessary to go through them again. He failed to see any contract between the plaintiff and the defendant. There was no evidence to show that the plaintiff and the defendant ever got together in any way, or that the plaintiff was recognised by the defendant in any way. On the contrary, it showed that if anything went wrong the plaintiff looked to Messrs. Clarke & Shortt as the only persons responsible to him.

After hearing further arguments, his Lordship gave judgment for the defendant on the point of law raised, with costs.

ACTION BETWEEN BANKS WITH REGARD TO ANCIENT LIGHTS.

THE case of the London and Midland Bank *v.* the National Provincial Bank came before Mr. Justice North in the Chancery Division on the 11th inst., on a motion by the plaintiffs for an interim injunction to restrain the defendants from an alleged infringement of the plaintiffs' ancient lights. It was stated that the defendants were building a new bank opposite that of plaintiff's in Park-row, Leeds, which it was alleged interfered with the plaintiffs' ancient lights.

Ultimately it was arranged that the motion should stand over for three weeks, it being stated that there was a probability of the respective architects arranging the matter.

A DISTRICT COUNCIL AND BUILDING PLANS:

IMPORTANT CASE IN THE DIVISIONAL COURT.

THE case of the Wetherby District Council *v.* Hewling came before a Divisional Court of Queen's Bench, composed of Mr. Justice Wright and Mr. Justice Bruce, on the 12th inst.

Mr. Scott-Fox appeared as counsel for the appellants (the local authority), and Mr. Compton for the respondent.

Mr. Scott-Fox explained that this was a case stated by the Justices of the West Riding of Yorkshire, and had relation to the building of some houses at Boston Spa. The respondent was a gentleman who had laid out a building estate on the side of a road which undoubtedly was an ancient highway leading to the River Wharfe. The road was about 30 ft. wide. The respondent had laid out about a dozen houses in the corner going down the road towards the bridge. When he originally submitted his plans the District Council called his attention to the fact that he was going on to an ancient highway, and they would disapprove of his plans unless he agreed that the road should be 36 ft. wide. The effect of that would be that he would have to throw 3 ft. into the road opposite his new houses. The plans were given back to the respondent for the purpose of making the alteration which he had consented to carry out. He altered his plans, which showed on the face of them a 36-ft. road, and in this condition they were sanctioned. After that he had again to make some alteration in the houses, and he submitted substituted plans showing a road 36 ft. wide. When he came to finish the houses in 1895, the respondent was advised he was under no obligation to make the road as required, although he had had his plans passed on the understanding that he would do so. He did not take down the wall that divided his premises from the road, and he was summoned for not having carried out his plans and constructing the new street as required by them, and, although the Bench offered to state a case, he did not accept it, and paid the fine. The defendant, however, did not pull down the wall, and another summons was taken out. On this occasion the Bench was differently constituted, and the magistrates then came to the conclusion that, in spite of the plans and his undertaking to make the road 36 ft. wide, yet, the road being an old highway, it was not subject to the by-law. The question for the Court to decide now was whether or not this was a new street which came within the by-laws.

Mr. Justice Wright: Is not that a question of fact alone?

Mr. Scott-Fox replied that the magistrates did not seem to have treated it as such. They had expressed no opinion, but they did not see their way to say that the respondent should be called upon to take down a wall which had stood for 100 years.

Mr. Compton said that the magistrates had expressly found as facts that the respondent did not by the erection of the houses lay out, or intend to lay out, a new street, and they also found that the road was not a new street.

Eventually their Lordships sent the matter back to the Justices with the three following intimations from them: (1) That only so much of the information should be retained as alleges the laying out of the new street less than 36 ft. wide; the rest should be struck out. (2) The magistrates are bound by the former conviction, the parties being the same, if, after hearing counsel for the respondent, they think that the former conviction necessarily or actually involved a decision that this was the laying-out of a new street. If so, they were to convict now. (3) If the former decision does not bind them, the question for them is, whether, under all the circumstances of the case, including all that was done in relation to the plans, they think, as a matter of fact, that the respondent, when he began to build, meant to begin and did begin to execute a building plan which would, when finished, constitute a road or a street. There was sufficient evidence to justify a finding either way on this point. Mr. Justice Wright added that no fresh evidence was to be called unless the Justices wished it.

POINT UNDER THE METROPOLITAN BUILDING ACT, 1894.

THE case of List *v.* Sharp came before Lord Justice Chitty in the Chancery Division on the 13th inst., for judgment on a motion by the plaintiff to continue an interim injunction until the trial, restraining the defendant from interfering with a wall. The case was argued before his Lordship on December 16 and 17 last. The facts were shortly these:—

By an agreement dated December 12, 1894, Sir Chas. Oppenheimer agreed to demise certain property in St. James's-place held by him under the Commisioners of Woods and Forests, to the plaintiff for a long term, at a rent of 550*l.* after Michaelmas, 1895, and the plaintiff agreed within a specified time to erect buildings on the land at an expense of not less than 100,000*l.* The production of a certificate, signed by the Commissioners' architect and surveyor, was made a condition precedent to the granting of the lease. It was further provided by the agreement that the plaintiff should forthwith, upon the signing of the agreement, be entitled to the possession of the land, and reserved to the surveyor and all officers and workmen of the surveyor, and of Sir C. Oppenheimer, acting on the authority of the surveyor, a right to enter upon the land at all times during the erection of the buildings for the purpose of examining buildings, and otherwise as therein mentioned. There was also a stipulation that nothing in the agreement should be construed "into a demise at law" of the premises so as to vest any estate to the plaintiff, but that he should only have a right to enter upon the premises for the purpose

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*New Town Hall	Enniskillen Corp.	50*l*. First, 20*l*. second, and 10*l*. Third	Mar. 20

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Electric Light Buildings, Fountain-street	Morley (Yorks) Corp.	R. Hammond, Engr. Ormonde House, Great Trinity-lane, E.C.	Jan. 19
*Making-up Roads	Tottenham D.C.	P. E. Murphy, Engr. at Council Offices	do.
*Broken Granite	Shoeburyness U.D.C.	J. W. Harris, Surv. Shoeburyness	do.
Slaughter-house, Shop, &c. Cleator Moor, Cumberland	,,	Sec. Co-op. Soc. Cleator Moor	do.
School, Chapel of Garioch	,,	R. G. Wilson, Archt. 181A, Union-street, Aberdeen	do.
Shop, Stables, &c. Station-street, Port Talbot, Wales	,,	Thomas & James, Archt. Port Talbot	Jan. 20
Six Houses, Victoria-road, Rashcliffe, Huddersfield	,,	J. Berry, Archt. 9, Queen-street, Huddersfield	do.
Road Works, Castle Gardens, Alnwick	,,	Secretary, Dist. Council Offices, Green Bat, Alnwick	do.
House, Boothferry-road, Goole	W. T. Lumley	H. B. Thorp, Archt. Goole	do.
Sewerage Works, Hotspur-street	Alnwick U.D.C.	G. Wilson, Town Surv.	do.
Sewer Extension, Solum	Dundee Harb. Trust.	G. C. Buchanan, Harbour Offices	do.
*Roadmaking and Paving	Hammersmith Vestry	H. Mair, 57, Fulham Palace-road, S.W.	do.
School, South Cave, Yorks	Newport & Wallingfen (U.D.) Sch. Bd.	Gelder & Kitchen, Archt. 76, Lowgate-hill	Jan. 21
Villa, Stabling, Lidget Green, Bradford	,,	S. Robinson, Arch. Cheapside, Bradford	do.
*Granite Kerb and Pitchers	Brighton Corporation	F. J. C. May, Town Hall	Jan. 22
*Roadmaking	Harwood's Farm Estate	Humber, Son, & Flint, Watford	do.
Cottages, Laithes, near Penrith	County Property Committee	G. D. Oliver, Archt. Carlisle	do.
Schools, George-street	Governors of Paisley Technical School	T. G. Abercrombie, Archt. 13, Gilmour-st. Paisley	do.
Pair Semi-detached Villas, Park-street Morley	H. H. Watson	T. A. Buttery, Archt. Queen-street, Morley	do.
*Erection of Officer's House and Outbuildings	Admiralty	21, Craven-street, Charing-Cross, W.C.	do.
Street Works, Arley-road, &c.	Bury (Lancs) Corp.	Borough Engr Bank-street, Bury	Jan. 23
Additions to Knowle Green School, Ribchester, Lancs.	,,	J. A. Seward, Archt. 119A, Fishergate, Preston	do.
Pipe Sewers	Bacup Corporation	J. Wilson, C.E. Boro' Surv.	Jan. 25
Paving, Sewering, &c.	Little Lever (Lancs) U.D.C.	W. J. Lomax, Surv. 11, Fold-street, Bolton	do.
Drainage Works	Elland U.D.C.	M. Paterson, C.E. 35, Manor-rd, Bradford	do.
*Alterations, Bar Fittings	Napier Tavern, 25, High Holborn, W.C.	,,	do.
*Articles and Works, Various	Chelsea Vestry	T. W. E. Heggins, Town Hall, King's-road, S.W.	Jan. 26

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Enlargement, Sorting Office, Colchester Post Office	Com. of H.M. Works	The Secretary, H.M. Office of Works	Jan. 28
*Block of Dwellings	London C.C.	Architect's Dept. 17, Pall Mall East, S.W.	do.
Kerbing, Channelling, &c. Baxter-st.	Kidderminster T.C.	A. Comber, Boro' Surv. Town Hall	do.
*Road Making and Repairs, Wylen-st.	Lewisham B. of W.	Surv. B. of W. Offices. Catford	do.
*Road Making and Repairs, Brockley-rd.	do.	do.	do.
*Road Making	Kingston-on-Thames Corp.	Boro' Surv. Clattern House, Kingston	Jan. 27
Additions to Locomotive Works, Darlington	N.E.Ry.Co.	W. Bell, Archt. York	do.
Gasholder Tank, Long Buckby, near Rugby	Gas and Coke Co.	W. Robinson, Gas Co.'s Offices, Long Buckby	do.
*Alterations, Runcorn Police Station	Cheshire C.C.	H. Beswick, Archt. 17, Newgate-st. Chester	do.
House, Sunnyside Farm, Drumoak, Aberdeen	,,	S. Stronach, 20, Belmont-st. Aberdeen	Jan. 29
Additions, &c. to School, Felinfoel	Llanelly Sch. Bd.	J. B. Morgan, Archt. Llanelly	Feb. 1
*Construction Arabic Museum and Library, Cairo	Egyptian Government	Ministry of Public Works, Cairo	do.
Banking Premises, Morley, Yorks.	L. & Y. Bank	W. Bakewell, Archt. Leeds	do.
*Tramp Wards, Porter's Lodge, &c.	Newhaven Union	Clayton & Black, 152, North-st. Brighton	Feb. 2
Residence, Isle of Rum, Oban, N.B.	,,	Leeming & Leeming, Archt. 117, Victoria-st. S.W.	Feb. 5
*Broken Granite	Norfolk C.C.	S. H. B. Heslop, County Surveyor. Norwich	Feb. 6
*Isolation Hospital, Carshalton	Croydon R.D.C.	R. M. Chart & Son, Union Bank-chambers, Croydon	Feb. 9
Sewerage Works	Brynmawr (Wales) U.D.C.	G. H. Daniel. Engr. Clarence-chbrs. Pontypool	Feb. 18
Re-building "Dressers' Arms" Inn, Heywood, Lancs.	Crown Brewery Co.	C. H. Openshaw, Archt. Fleet-st. Bury	No date
*Operating Theatre at Hospital	Swansea Hospital Committee	Wilson & Moxham, 15, Castle-st. Swansea	do.
School, Edgmond, nr. Newport, Salop	Committee	J. R. Veall & Son, Archt. Wolverhampton	do.
Additions to Premises, Wilton, Wilts.	J. White	F. Bath, Archt. Salisbury	do.
Chapel and School, Osgodby, near Market Rasen	,,	F.W. Dixon, Archt. Trevelyan-buildgs. Manchester	do.
Club Premises, Padiham, Lancs.	,,	Hitchon & Pritchard, Archt. Manchester-rd. Burnley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Draughtsman and General Assistant	St. Pancras Vestry	120*l*. rising to 150*l*. per annum	Jan. 21
*Engineering and Architectural Draughtsmen	Edmonton U.D.C.	2*l*. 10*s*. per week	Jan. 20
*Instructors and Assistant Instructors in Woodwork, 27½ hours per week	Sch. Bd. for London	Instructors 100*l*. rising to 155*l*.; Assistants 80*l*. rising to 100*l*. per annum	Jan. 30

Those marked with an asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv. vi. & viii. *Public Appointments, pp.* xviii. & xxi.

of performing the agreement. The plaintiff accordingly entered upon the land, and pursuant to the agreement proceeded to erect the buildings. The defendant, who was the adjoining owner, wishing to execute certain works upon a wall, about which there was some controversy as to whether it was a party wall or a party fence wall, gave in February, 1896, the necessary notices, under the London Building Act, 1894, to Sir Charles Oppenheimer, but omitted to give any to the plaintiff. At the time, the plaintiff had nearly completed the buildings, but had not obtained the lease. In August, 1896, the lease was granted to the plaintiff, and an *ex parte interim* injunction had been obtained by the plaintiff, restraining the defendant, as building owner under the Act, from interfering with the wall, which injunction it was now sought to continue till the trial.

His Lordship, in the course of an elaborate judgment, granted an injunction, restraining the defendant in the terms of the notice of motion, but without prejudice to the rights, if any, of the defendant, under the Metropolitan Buildings Acts, the hearing of the motion to be treated as the trial if the parties should so agree.

Mr. Byrne, Q.C., and Mr. R. C. Glen appeared as counsel for the plaintiff; and Mr. Levett, Q.C., and Mr. C. Jones for the defendant.

MEETINGS.

FRIDAY, JANUARY 15.

Architectural Association. — Mr. E. Prioleau Warren on "Decorative Plaster Work," with models. 7.30 p.m.

Institution of Civil Engineers. — Students' Meeting, Mr. Walter Beer on "'Monier' Girders and Arches." 8 p.m.

SATURDAY, JANUARY 16.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

SUNDAY, JANUARY 17.

Sunday Lecture Society.—Professor Norman Collie, F.R.S., on "The Mountains of Great Britain." 4 p.m.

MONDAY, JANUARY 18.

Royal Institute of British Architects. — Sixth General Meeting (Ordinary). Address to Students by the President; and some critical observations on the students' work, after which the presentation of prizes will be made by the President. Prior to the distribution of prizes, Mr. Alfred Waterhouse, R.A., the new Chairman of the Board of Examiners, will present, on behalf of past and present members of the Board, a testimonial to Mr. Arthur Cates, in recognition of his services as Chairman of the Board. 8 p.m.

Victoria Institute.—Professor Hull, F.R.S., on "The Assouan Embankment." 4.30 p.m.

Leeds and Yorkshire Architectural Society. — Mr. Max Clarke on "The Experiments conducted by the R.I.B.A. as to the Strength of Brickwork." 7.30 p.m.

TUESDAY, JANUARY 19.

Institution of Civil Engineers.—(1) Further discussion on Professor W. Ripper's paper on "Superheated-Steam Engine Trials." (2) Time permitting, the following papers to be read:—(*a*) "The Diversion of the Periyar," by Colonel J. Pennycuick; (*b*) "The Periyar Tunnel," by Mr. P. Roscoe Allen. 8 p.m.

WEDNESDAY, JANUARY 20.

Liverpool Engineering Society. — Paper by Mr. T. Parker. 8 p.m.

THURSDAY, JANUARY 21.

Society of Antiquaries.—8.30 p.m.

London Institution.—Mr. H. J. Powell on "The Art and Craft of Glass-making," illustrated. 6 p.m.

Royal Institution. — Professor H. A. Miers, M.A., F.R.S., on "Some Secrets of Crystals," I. 3 p.m.

Institution of Civil Engineers.—Students' Visit to the Engine Works of Messrs. James Simpson & Co. 2 p.m. (Assemble at the works, Grosvenor-road, Pimlico, S.W.)

Devon and Exeter Architectural Society. — Mr. Edmund Sedding on "Local Gothic Architecture," at the School of Art, Princess-square, Plymouth. 7.30 p.m.

FRIDAY, JANUARY 22.

Royal Institution.—Professor Dewar, M.A., F.R.S., on "Properties of Liquid Oxygen." 9 p.m.

Institution of Junior Engineers (*Westminster Palace Hotel*).—Professor A. Barr, D.Sc., on "Comparisons of Similar Structures, Large and Small." 8 p.m.

SATURDAY, JANUARY 23.

Institution of Junior Engineers. — Twelfth Annual Dinner, Westminster Palace Hotel. The President, Mr. A. R. Binnie, in the chair. 6.30 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

23,360.—VENTILATION OF SEWER ENTRANCE COVERS AND OTHER DRAINAGE COVERS: *W. H. Morgan.*—With the object of rendering manhole covers, lamp-hole covers, side-entrance covers, &c., ventilating or non-ventilating at will, the inventor so arranges a dirt-box below cover that it can be easily raised or lowered by means of arms, centre plate, bolts and nuts, &c. When ventilation is desired, the dirt-box is permitted to rest on bracket arms, leaving a free passage for the accumulated gases to escape.

23,973.—BRICK AND TILE-MAKING MACHINERY: *S. S. Anderson.*—In a double-shaped pug-mill, the inventor fixes twin screws or propellers, to revolve right and left. These are fixed at the end of each shaft. A box coupling is also fixed on each shaft, so that one or both shafts can be taken out if desired.

24,992.—LADDERS: *A. G. Perkins.*—The ladder is formed in two parts, one sliding in grooves or hollows formed in the other part; a screw bolt passes through apertures in one of the sliding parts and engages in a screwed aperture in the other part, thus securing the two parts together, so that the length of the combined ladder may be regulated as required. It can also be adapted for use as a step-ladder.

19.—WOOD BLOCK FLOORING: *J. W. Mussellwhite.*—The invention consists of wooden blocks, in length three times their width, with a tongue worked on one side, and a groove on remaining three sides. It is claimed that such blocks can be laid much thinner than any in use.

1,997.—CENTRE-BITS AND SIMILAR TOOLS: *A. von Kunowski.*—In order to provide means for quickly and easily removing the chips from holes bored (especially long ones), inventor adopts, in combination with the boring bit proper, a tube, having the said boring bit fixed to it, and adapted to receive the chips produced by the said bit, also a threaded spindle arranged within such tube, a racket wheel, and other details.

2,633.—STONE-SAWING MACHINERY: *G. Anderson.*—The invention relates to stone-sawing machinery of the type where stone is secured on a bogie while being acted on by reciprocating saws, actuated by a steam-engine, &c. The saw frame is suspended by means of pendulums from slides, whose position, and, therefore, that of the saw, is determined by four wire ropes, controlled by a central barrel. The saws are fed down to the work by this barrel and ropes. Such barrel may be moved slowly by the feed motion, or may, by various means, be adjusted to actuate the saw frame quickly.

2,843.—KILNS FOR LIME, CEMENT, &c.: *H. Simmonds and another.*—The invention relates to improvements in kilns described in patent 7,435 (1895). Inventors construct kiln with one or more producers on the outside thereof. Between delivery passage of producer and inlet passage of kiln they place a combustion chamber built of fire-brick. Complete combustion of the gas takes place therein and the products, in a highly heated state, are delivered to interior of kiln. By this construction, inventors claim that they raise the products to a greater temperature than when combustion takes place in the interior of the kilns, and thereby obtain a greater heat in the interior.

3,416.—KERBS, EDGING BLOCKS, PLATFORM COPINGS, &c.: *R. F. Tyhurst.*—Inventor cuts or moulds an extension or cap in the inner face of a kerb, &c., with a forwardly sunken top surface, into which, or from which, angle holes, channels, or gutter-like grooves can be formed, to lead any water percolating through joint seams, from deflection of the path, flags, or other causes, to the front or in other direction desired.

24,307.—ADJUSTABLE STOPS FOR WINDOW SASHES, &c.: *F. J. J. Gibbons.*—This invention relates to adjustable stops for sashes, &c., whereby the amount of opening can be regulated. It comprises a cylindrical bolt, provided with an interior screw-thread, secured to top sash at about 6 in. from the bottom rail. In bottom sash is secured a plate, furnished with two, three, or more holes, wherein said bolt may engage. Bolt is unlocked by a key.

2,475.—CHIMNEY COWL: *J. McLaren.*—In order to prevent down draught, the inventor arranges a number of round louvres, made of sheet iron, &c., one above the other, about three inches apart, and set at an angle. This gives the opening for smoke. Inside top of flue a baffle cone is held in position by three guide rods to direct the

down-blow through the top louvre opening, leaving the other four openings to give free outlet for the smoke.

2,614.—ARTIFICIAL STONE: *F. W. Maxwell and Another.*—The inventors take a quantity of any suitable stone—other than marble—in the form of chips or powder, and oxide of magnesium, or its chemical equivalent, and mix them thoroughly in a dry state and in a dry place, in the proportion of, say, three parts stone and one part oxide, with colouring matter if required. Mixed materials are then moistened with a solution of magnesium chloride, or its chemical equivalent, beaten up or mixed into a mass, and moulded as desired.

5,404.—VENTILATING CHIMNEY TERMINALS.—*J. Walker.*—The inventor places at summit of flue a system of spiral louvres, or circular vanes. Preferably, he also provides beneath these three downwardly and outwardly projecting tubes, in order to increase up draught.

17,022.—PLASTER SLABS FOR BUILDING: *A. Mack and Another.*—The inventors, in order to form their "Mackolith," lay on the bottom of the mould a board to which are attached ledges of india-rubber. Into the spaces between these are laid thin plates of earthenware, &c., for "facing plates." Mould is now filled with liquid mortar, and wooden laths are pressed into this so that they will be situated behind the joints of the face plates. As soon as mortar is set plate is taken out and dried in the air. These plaster slabs can be made with a facing on both sides. Process is applicable not only to flat slabs, but also to convex and concave surfaces.

18,238.—JOINTS FOR DRAIN-PIPES, &C.: *T. W. Yardley.*—The socket portion of pipe is made with a loose piece, which is arranged to be on top-side when pipes are laid. This end is so formed that any lengths of piping may be so laid, one after the other, by lowering them vertically, and without moving them endwise into the sockets.

22,862.—VENTILATING: *H. Simcock.*—Inventor employs a bell or enlarged-lower-end-shaped vertical tube of suitable size, rising from ceiling and passing through roof. Lower end of this is provided with a grid. The upper end of this vertical shaft is furnished with four-way horizontal cross tubes, arranged at a suitable height and position, their ends being of a shape to afford protection from stormy weather. Thus, from whatever quarter the wind is blowing, an efficient suction is provided.

23,814.—SLABBING TILES, MOSAICS, &C.: *W. H. Godwin.*—In order to prevent the warping of slabbing tiles, mosaic panels for grates, &c., inventor provides at the back of the cement, &c., a series of plates of metal, earthenware tiles, slates, &c., preferably of rectangular shape, which provide a counteracting influence in the process of the shrinking of the cement, holding the mosaic tiles, &c.

25,259.—SAWING STONE AND MARBLES: *G. A. E. Wincqz.*—In order to cause the saw-frame to descend proportionately to the cut, inventor combines with a suspended saw-frame for sawing stone, &c., a feed-regulating device formed by a hydrostatic balance, consisting of a counter-weight immersed in water, suspended by a rope winding on a drum, from which unwinds the suspension ropes of the saw-frame as the sawing proceeds.

NEW APPLICATIONS FOR LETTERS PATENT.

December 21.—29,235, C. Hartnell-Sinclair, Self-acting Lock-fastener for the Automatic Locking of Windows, &c.—29,264, H. Cross, Link Trap.—29,347, F. Gutteridge, Brick-making Machines.

December 22.—29,386, R. Copeland, Ovens for use in Firing Pottery Ware.—29,406, J. Duckett & Son, Limited, and others, Sink Supports and Fittings.—29,427, J. Willmore, Pavement Lights.—29,429, B. Mills, Brick Kilns.—29,453, T. Yorke and W. Pare, Flushing Appliance for Urinals, &c.—29,465, L. Messinesi, Carpenters and Joiners' Benches.—29,489, W. Durrant, Gully Grease or like Traps.

December 23.—29,516, J. Mortimer & J. Williams, Fastener for Securing Solid Disinfectants or Deodorizers to Urinal Basins, Watercloset Basins, &c.—29,578, M. Syer, Syphons.—29,526, T. Crooke & J. Nicholls, Raising, Lowering, and Holding Window Sashes.

DECEMBER 24.—29,630, I. Watts, Ventilator.—29,637, J. Glendenning, Fixing of Door Locks.—29,642, B. Draper and others, Fireplaces.—29,654, O. Kraner, Process for the Production of a Material for Making Floors, Plastered Ceilings, &c., without Joints or Chinks.—29,681, C. Stafford-Noble and others, Door Hinges or Pivots.—29,698, F. Hughes, Sashes of Windows, Doors, &c.

DECEMBER 28.—29,765, D. Cameron and others, Drain Plugs.—29,823, W. Lambert, Fire-grates or Stoves.—29,864, A. Zboril and A. Schenk, Plates, Slabs, &c., for Floors, &c., and Method of Manufacturing same.—29,865, A. Zboril and A. Schenk, Covering for Floors, Walls, &c.

DECEMBER 29.—29,870, J. Tucker, Electric Lighting Switches.—29,900, J. Stewart, Domestic Grates.—29,910 J. Duckett & Son, Limited, and others, Machinery fo Making Sanitary Pipes.—29,916, G. St. John, Firegrates —29,940, W. Gedge, Windows.

DECEMBER 30.—29,994, G. Gregory, Ball Inlet Ventilator.—30,009, J. Eckersley, Coping for Walls &c.—30,012, H. Sutcliffe, Lavatory or Cabinet Stand Wash Basins.

DECEMBER 31.—30,102, G. Robertson and others, Bricks and Brickwork.—30,109, J. Wood, Firegrates.—30,155 F. Sinzig, Fastening of Floors and Ceilings in or to I irons.

JANUARY 1.—15, G. De Tunzelmann, Electric Light Fitting.—17, J. Goodwin, Cowl or Chimney-pot for Preventing down-draught in, and rain from descending chimney-flues.—22, R. Wood and S. Richards, Draught and Dust Excluder as applied to doors, windows, door and window-frames and casings, &c.—50, D. Buchan, Drain Traps.—52, W. Osment, Block for Spindle Wood-working Machines.—58, T. Partridge and E. Abbott, Device for Drain Wells leading to Sewers, &c., and for disinfecting same.—59, J. Kirkbride, Device for Preventing Window Sashes from Rattling.—60, J. Kirkbride, Sash-fastener.—61, J. Whitehead, Casement Windows, and Hinges for Windows and Doors.—68, B. Gypson, Skylight Frames, &c.—75, W. Norris, Chimney-tops.—83, C. Cockson, Doors, Windows, Sliding Shutters, &c.—84, A. Woolley, Fastenings for Doors, Hinged Panels, &c.—93, W. Coats, Chimney-cowls.

JANUARY 2.—97, G. Bray, Arrangements for Gas Lights.—131, C. Hubbard, Cooking Ranges.—117, V. Ceruti, Device for Preventing the Picking of locks.

PROVISIONAL SPECIFICATIONS ACCEPTED.

23,941, W. Thompson, Imitation Wood Carvings.—25,874, W. Borrer, jun., Tool for Wood Working.—26,407, O. Henschel, Coverings for Roof and Walls.—26,450, E. Hodgkinson, Gutter Tiles for Roofing Purposes. 26,713, E. Jackson, Lead Bars for Lead Glazing.—27,379, W. Allen, Flushing of Drains, Sewers, &c.—27,407 J. Madeley, Syphon Flushing Apparatus.—27,648, A. Taylor, Artificial Stone for Building, Paving, &c.—27,819, F. Smith, Fastenings for Windows, &c.—28,069, A. Boult, Stoves or Fireplaces.—28,311, C. Shaw, Novel or improved constructions or formations of sheet metal capping valley pieces and flashings for use with roofs which are covered with corrugated sheet metal.—28,429, A. Sabine & T. Sabine, Earthenware Sinks, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

1,389, T. Simmonds, Combined Fastener and Opener for Skylight, &c.—1,712, T. Elliott, Urinals.—2,810, S. Abram, Continuous Down Draught Brick Kiln.—4,198, W. Hougham, Cupboard and other Door Fasteners.—4,273. W. McLaren, Window Blind Apparatus.—163, J. Mearns, Drain Trap.—383, J. Jones, Preventing Pipes Bursting through Frost.—2,223, F. Turner, Cement or Artificial Stone.—20,665, A. Bungblut & E. Crouch, Window and Door Fastener.—24,242, A. Cléry, Artificial Stone.—26,145, R. Bell & W. Hall, Water and like Taps.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	0/0/0
Teak, E.I. ....load	11/0/0	16/0/0
Sequoia, U.S. ft.cu.	0/0	0/1
Ash, Canada load	2/10/0	3/15/0
Birch, do.	3/10/0	5/5/0
Elm, do.	3/5/0	4/10/0
Fir, Dantsic, &c..	2/10/0	4/10/0
Oak, do.	2/10/0	3/10/0
Canada	4/15/0	5/15/0
Pine, Canada red	0/0/0	0/0/0
Do. Yellow	2/0/0	4/0/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log	2/10/0	4/15/0
Odessa, crown....	2/10/0	4/15/0
Deals, Finland 2nd & 1st std 100	8/10/0	9/0/0
Do. 4th & 3rd...	8/10/0	9/0/0
Do. Riga	7/0/0	8/0/0
St. Petersburg, 1st yellow... .	10/12/0	13/0/0
Do. 2nd yellow	9/10/0	10/10/0
Do. white	9/0/0	11/0/0
Swedish	8/10/0	16/0/0
White Sea.....	8/10/0	16/10/0
Canada, Pine 1st	21/0/0	23/10/0
Do. do. 2nd	15/0/0	17/0/0
Do. do. 3rd, &c.	7/10/0	11/0/0
Do. Spruce, 1st.	9/0/0	10/10/0
Do. do. 3rd and 2nd	7/10/0	8/15/0
New Brunswick	7/5/0	7/15/0
Battens, all kinds	5/0/0	20/0/0
Flooring boards, sq., 1 in. prep. 1st	0/9.6	0/16/6
Do. 2nd	0/8/0	0/13.0
Other qualities—	0/6/0	0/7/6
Cedar, Cuba, ft.	/4½	/5
Honduras, &c.	/4	/5
Mahogany, Cuba	/4½	/6
St. Domingo, cargo av.	/4½	2/3
Mexican, do. do.	/4	/5
Tobasco, do. do.	/5	/7
Honduras, do.	/5	/6½
Box, Turkey, ton	4/0/0	15/0/0
Rose, Rio.....	7/0/0	18/0/0
Bahia	6/0/0	15/0/0
Satin, St. Doming.	0/0/7	0/2/0

TIMBER *(continued)*.		
Satin, Porto Rico	0/0/7	0/1/6
Walnut, Italian ..	0/0/3	0/0/7
METALS.		
Iron—Pig, in Scotland .....ton	2,8/7	c/o/o
Bar, Welsh, in London.....	5/15/0	5/17/6
Do. do. at works in Wales	5/10/0	5/12/6
Do. Staffordshire, in London.....	5/15/0	6/10/0
COPPER—British cake and ingot	53/5/0	53/15/0
Best selected ..	54/5/0	54/15/0
Sheets, strong..	59/0/0	60/0/0
Chili bars	49/17/6	0/0/0
YELLOW MTL lb.	0/0/5	0/0/5½
LEAD—Pig, Spanish ...ton	11/13/9	11/15/0
English com. brands	11/15/0	11/17/6
Sheet, English 6 lbs. per sq. ft. and upwards ..	13/0/0	0/0/0
Pipe	13/1./0	0/0/0
ZINC—English sheet.....ton..	20/10/0	0/0/0
Vieille Montagne	21/10/0	0/0/0
Spelter	17/17/6	17/18/9
TIN—Straits	59/1/3	0/0/0
Australian.....	60/5/0	62/10/0
English Ingots..	63/0/0	64/0/0
Banca	61/0/0	0/0/0
Billiton	59/15/0	60/0/0
OILS.		
Linseed .....ton	15/5/0	16/0/0
Cocoanut, Cochin	27/15/0	0/0/0
Do. Ceylon	24/0/0	0/0/0
Palm, Lagos.....	24/10/0	0/0/0
Rapeseed, English pale	27/10/0	27/15/0
Do. Brown	27/0/0	27/10/0
Cottonseed ref. ..	15/17/6	16/10/0
Oleine.....	18/10/0	19/10/0
Lubricating U.S.	0/6/3	0/7/6
Do. black	0/4/9	0/6/6
TAR—Stockholm barrel	22/0	0/0/0
Archangel.....	0/12/6	0/0/0
Turpentine....ton	22/15/0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender: and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

BEDFORD.—For sewers and road-making works, St. Cuthbert's Glebe Building Estate, for Messrs. Hobson & Martin. Mr. Richard Lund, architect, 8, St. Paul's-square, Bedford:—

G. Harrison.....	£1,570 0	G. Fathers	£1,435 1
Rootham & Jeakings..	1,531 18	H. Williamson*.....	1,336 10
T. Coleman	1,496 0	* Accepted.	

[All of Bedford.]

BLACKROCK (Co. Dublin).—For the erection of artisans' dwellings, for the Town Commissioners. Messrs. Millar & Symes, architects, 186, Great Brunswick-street, Dublin:—

R. F. Lidwill	£5,475	S. Worthington	£4,989
J. Lawlor	5,330	E. & R. Warren.....	4,949
M. Meade & Son	5,270	John Pemberton.....	4,788
M. Glynn	5,119	W. Connolly	4,750
George Dixon	5,107	C. Jolley (accepted)	4,645

BRIDPORT.—Accepted for the restoration of the parish church, for the Rector and Churchwardens and others. Mr. C. E. Ponting, F.S.A., architect, Marlborough:—

F. Merrick & Son, Glastonbury.....£745

BURTON-ON-TRENT.—For erecting a Minister's house, Shotnall-street, Burton-on-Trent. Mr. Chas. F. Underhill, architect, Burton-on-Trent:—

J. & C. Hunter	£996 0 0	G. Hodges	£897 0 0
J. Maddocks	977 19 0	A. Geary	847 0 0
C. Brayford.....	975 0 0	J. & T. W. Selby....	828 10 0
J. T. Varlow	929 0 0	Rd. Kershaw	825 0 0
T. Lowe & Sons	912 0 0	J. Harlow.....	807 0 2
Chamberlain Bros. ..	900 0 0	S. Stephens*	800 0 0
Hy. Edwards.....	898 0 0	* Accepted.	

CARDIFF.—For making roads and sewers, Barry Island for the Land Company. Messrs. A. Trevor Roberts, Hill, & Co., estate agents and surveyors:—

T. Rees	£1,368	J. W. Froom.....	£1,177
Barnes, Chaplin, & Co. ..	1,313	McKay & Davies, Queen-street, Cardiff*	1,630
W. Davies.....	1,300	* Accepted.	

COLCHESTER.—For the erection of shop, &c., St. Botolph's-street, for Mr. Geo. Mence Smith. Mr. J. W. Start, architects, Cups-chambers, Colchester:—

Saunders & Son	£1,580	F. Dupont	£1,375
G. Dobson.....	1,580	W. Chambers, Colchester*	1,399
E. West	1,500	* Accepted.	

DARTFORD.—For the erection of caretaker's house, mortuary, &c., Overy-street, for the Urban District Council. Mr. W. Harston, C.E., High-street, Dartford:—

T. Knight	£2,979 0	J. Lonsdale.....	£2,779 0
T. Martin	2,949 0	Multon & Wallis	2,398 0
H. J. Galer.....	2,783 11		

DOWNE.—For counter and bar fittings at the "Queen's Head Inn," Downe, Kent, for Nalder & Collyer's Brewery Company, Limited. Mr. Robert M. Chart, architect, Union Bank-chambers, Croydon:—

Farmiloe & Sons £270 10		Smith & Sons	£137 0
Sanders & Sons 167 10			

DURHAM.—For additions, &c., to workhouse, for the Union Guardians. Mr. H. T. Gradon, architect, Market-place, Durham:—

G. T. Manners £4,087	0 0	Wm. Walton.....	£3,735 0 0
Ed. Taylor	3,941 0 0	Thos. Coates	3,704 0 0
F. Caldcleugh.....	3,915 0 0	Wm Wardropper ..	3,500 0 0
J. Kell.....	3,908 7 11	G. Gradon & Son, Durham*	3,494 7 0
J. Shepherd.....	3,850 0 0		
J. G. Bradley	3,800 0 0	* Accepted.	

EAST BARNET.—For new roads and sewers at East Barnet, for the Great Northern London Cemetery Company. Messrs. E. P. Croucher & Co., surveyors, 76, Chancery-lane, W.C.:—

Nowell & Robson ..£5,125	0 0	Geo. Bell £3,867	0 0
William Griffiths....	4,532 14 4	C. W. Killingback & Co.....	3,797 0 0
William Neave & Son	4,524 0 0	James Nash	3,760 0 0
Rowland Bros.	4,496 14 0		

[Surveyor's estimate, £3,806. 5s. 8d.]

GATESHEAD.—For sewering, &c., Back Westbourne avenue:—

W. Cumming £293	5 8	G. E. Simpson, Newcastle (accepted) ..£253	9 4
J. W. Robson 283	3 10	J. Wardlaw 248	12 6
G. Maughan..... 262	15 5		
J. Robson..... 261	7 6		

HARROGATE.—Accepted for levelling, paving, &c., streets on Valley Park Estate, for the Corporation. Mr. Samuel Stead, Borough Surveyor, Municipal Offices, Harrogate:—

William Annakin, 53, Franklin-road, Harrogate £3,990 6 2

ILKLEY.—For the execution of street works (seven contracts), for the Ilkley Urban District Council. Mr. W. A Palliser, Surveyor, District Council offices, Ilkley:—

Easby Drive.

	Roadway.	Asphalting Footways.
Matthew Hall.....	£353 17 3	£286 2 0
W. Barraud.....	347 0 6	181 0 9
John Murdock	332 3 6	—
R. W. Ibbotson, Horsforth, near Leeds*	250 7 2	206 0 0
The Asphaltic Concrete Co., Birmingham*	—	170 0 0

Riddings-road (No. 1 Portion).

John Murdock £45	0 9	Matthew Hall £62	12 0
R. W. Ibbotson, Horsforth, near Leeds*..	37 19 0	W. Barraud 40	10 6

Riddings-road (No. 2 Portion).

	Roadway.	Asphalting Footways.
Matthew Hall	£165 13 8	£93 17 0
W. Barraud	136 9 11	56 17 6
John Murdock	130 18 5	—
R. W. Ibbotson, Horsforth, near Leeds*	122 6 11	97 10 0
The Asphalte Concrete Co., Birmingham*	—	54 3 4

West-street.

Matthew Hall £34	10 9	R. W. Ibbotson £26	8 3
John Murdock 27	2 0	W. Barraud, Bradford* 25	6 6

Hawksworth-street.

Matthew Hall..... . £60	15 3	R. W. Ibbotson £45	8 7
John Murdock 49	10 1	W. Barraud, Bradford* 43	11 5

South Hawksworth-street, and a portion of North-street.

	Roadway and Sewerage.	Asphalting Footway.
Matthew Hall	£396 2 0	£59 17 1
John Murdock.....	329 13 12	—
R. W. Ibbotson	299 9 4	63 15 0
W. Barraud, Bradford*	297 9 4	37 3 9
The Asphalte Concrete Co., Birmingham*	—	35 9 4

* Accepted.

LEEDS.—For the erection of a tramway depot, &c., for the Corporation:—

Builders' Work.

Schofield & Sons, Leeds.....£13,394

Ironwork.

Clayton, Sons, & Co., Ltd., Hunslet..... 6,692

LEYTON.—For private street works, for the Leyton District Council. Mr. W. Dawson, engineer and surveyor, Town Hall, Leyton:—

G. Wilson £4,824	4 2	W. Griffiths £4,297	11 9
T. Adams 4,82	2 7 8	J. Jackson, Grove House, Leyton* ..	4,252 0 0
G. J. Anderson 4,451	19 8		

* Accepted.

[Surveyor's Estimate, £4,680.]

LONDON.—For converting nurses' cubicles into a ward, and forming an approach to the new Nurses' Home, at the Infirmary, Cale-street, Chelsea, for the Chelsea Guardians. Messrs. Lansdell & Harrison, architects, 12, Compton-terrace, Highbury, N.:—

G. Godson & Sons £1,675		H. Brown £1,395	
W. Laurence 1,637		The General Builders, Ltd	1,350
F. & H. F. Higgs 1,535		R. E. Williams, Battersea*	1,252
W. H. Lorden & Son 1,487			

*Accepted.

LONDON.—For alteration and addition to the "Ladywell Tavern," S.E., for Mr. Hawks. Mr. H. Roberts, architect:—

Todd £1,163		Taylor Bros. £895	
Simpson & Cove..... 1,000		Grover & Co.* 637	
Scotland & Ward 995			

* Accepted.

LONDON.—For the erection of a convent, 26, Bow-road, E. Mr. J. H. Eastwood, architect, 9, Gilston-road, Kensington:—

G. Sharpe £6,776		Gregar £6,469	
W. Meil 6,548		Jarvis 6,388	
Munday..... 6,545		W. Watson, Ilford* 6,280	

* Accepted.

LONDON.—For alterations to the Railway Hotel, Shepherd's Bush, W., for Messrs. Holway & Moore. Mr. J. Henry Richardson, architect, 67, Shepherd's Bush Green, W. Quantities by Mr. T. Woodbridge Biggs, 10, Clifford's Inn, E.C.:—

E. Lawrance & Sons.....£5,163		G. Wimpey & Co. £4,775	
J. Anley..... 5,134		G. Todd..... 4,747	
Beer & Gash 4,973		T. Bendon 4,739	
Killby & Gayford 4,965		Courtney & Fairbairn....	4,569
Drew & Cadman 4,873		R. Eddle	4,457

LONDON.—For alterations to the Railway Hotel, Stratford. Mr. Henry J. Hollingsworth, architect, 20, Old Cavendish-street, W.:—

J. H. Johnson £2 589		T. Welsh & Son £2,360	
A. E. Symes..... 2,382		Edwards & Medway	1,999

LONDON.—For alterations to the "Mermaid" public-house, 364, Mare-street, Hackney, for Mr. James Bond. Mr. Joseph G. Needham, architect, 11, Powerscroft-road, Clapton, N.E.:—

Wm. Crispin £690		E. Lancaster*.....£284	
Sheffield Bros..... 343			

Pewtering.

Wm. Paddon, jun.* £45

* Accepted.

HALESOWEN (near Birmingham).—For the construction of collecting sewers at Lye, Wollescote, Cradley, and three other parishes, for the Urban District Council. Mr. W. Fiddian, engineer, Town Hall, Stourbridge :—

——	Halesowen.	Hasbury.	Hawn.	Cradley.	Lye.	Wollescote.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
R. C. Brebner	3,636 0 0	2,570 8 9	1,418 16 4	5,399 10 0	4,161 0 0	3,670 4 3
J. Mackay, Hereford	*2,998 11 0	*2,386 1 6	*964 3 3	5,027 5 0	3,854 5 7	3,455 12 1
T. Vale	3,123 10 0	2,515 0 0	1,080 12 6	6,069 3 0	4,582 15 0	3,224 5 0
H. Holloway	3,082 10 0	2,747 0 0	1,145 0 0	6,057 0 0	4,610 0 0	3,363 0 0
G. Law	3,850 0 0	3,245 0 0	1,159 0 0	7,127 0 0	5,268 0 0	4,200 0 0
Currall, Lewis, & Martin	3,800 7 1	3,119 9 1	1,242 6 8	7,046 13 4	5,385 17 4	3,730 5 3
Jones & Fitzmaurice	5,205 9 1	4,356 14 6	1,671 9 2	9,833 10 7	7,740 5 8	5,309 3 9
Cruwys & Hoborough, Gloucester	†2,470 9 6	†1,922 6 7	†820 16 1	*4,579 9 7	*3,775 10 11	*2,605 1 2
Walker & Co.	3,523 19 0½	2,985 15 4½	1,144 19 2½	6,467 10 5½	4,852 13 9½	3,470 0 11
W. Meredith	4,211 3 7½	3,343 18 4	1,171 2 1½	7,246 16 3	5,449 0 2	4,201 10 0
J. Jackson	3,196 0 0	2,613 7 0	1,022 0 0	5,847 0 0	4,571 0 0	3,149 0 0
Hughes & Son	—	—	—	6,048 18 0	4,379 2 6	3,295 8 9
Guest & Sons	—	—	—	†4,240 7 7	†3,256 3 6	†2,236 7 9
Matthew Hall	—	—	—	6,022 8 8	—	—
J. Jeavons	—	—	—	—	—	2,883 6 4

*Accepted. †Withdrawn.

SCARBOROUGH. — Accepted for the erection of a cottage, Weaponness Estate, Jackson's-lane, for the Town Council. Mr. Joseph Petch, Borough Surveyor, Town Hall, Castle-road, Scarborough :—

Brick and Stone.—W. T. Petch	£137 0 0
Joinery and Carpentery.—G. W. Earnshaw	64 10 0
Plumbing and Glazing.—G. Cooper	9 19 9
Slating.—C. Pullan	15 14 3
Total	£227 4 0

[All of Scarborough.]

SURBITON.—For the execution of sewerage works, &c., Minniedale, James-street, and Etwell-place, for the Urban District Council. Mr. S. Mather, C.E., Victoria-road. Surbiton :—

E. Iles	£735 13 4	W. Adamson, Kingston-on-Thames*	£597 0 0
Lee & Son*	709 17 3	J. Jackson†	579 19 10
S. Kavanagh	692 6 8	Pickthall & Son	479 15 0
S. Atkins	657 6 0	J. Porter	476 0 0
Killingbach & Co.	653 0 0		

*Accepted. †Withdrew.

[Engineer's estimate, £572 10 11.]

LONDON.—For the erection of two shops, Nos. 308 and 310, Mare-street, Hackney, E., for Mr. C. Evans. Mr. Robert M. Chart, architect, Union Bank-chambers, Croydon :—

Rice & Sons	£2,597	D. Glayzer	£2,095
J. Smith & Sons	2,373	Josolyne & Young	2,013
Hanscomb & Smith	2,275	Dorrell Bros.	1,985
E. Goulder	2,263		

WHETSTONE (Leics.).—For the construction of sewers, &c. for the Blaby Rural District Council. Mr. W. King, surveyor, Alliance-chambers, Horsefair-street, Leicester :—

Jas. Johnson	£221 16 10	John Holme	£149 5 4
Stimson & Rolleston	168 3 3	Wm. Lord	130 4 9
Thos. Philbrick	165 0 0	Baker & Bailey	120 7 6
Halford & Sons	157 12 0	Haycock & Son, Glen-Magna, Leicester*	111 0 0
R. Brant	155 16 0		

* Accepted.

TO CORRESPONDENTS.

G. H. P., H. W., A. P. (Below our limit).

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, 'THE BUILDER,' LONDON.

THE INDEX and TITLE-PAGE for VOLUME LXXI. (July to Dec. 1896) was given as a supplement with the number dated Jan. 9.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each, and

THE SEVENTY-FIRST VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, will be ready on the 18th inst.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

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FOUR lines (about thirty words) or under ..... 2s. 6d.
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PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Front Page should be in by TWELVE noon on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before 10 a.m. on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office,* 46, Catherine-street, Covent Garden, W.C. *free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s.

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"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

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BATH,
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(incorporating The Ham Hill Stone Co. and C. Trask & Sons, The Doulting Stone Co.).
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand,

A TEST OF OVER FORTY YEARS has proved that
SZERELMEY STONE LIQUID
Absolutely waterproofs and preserves Bricks, Stone, Cement, Stucco, Plaster, &c.
SZERELMEY & Co., Rotherhithe New-road, S.E.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

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Employ a large and efficient Staff especially for.
Bills of Quantities, &c.
4 & 5, East Harding-st., Fetter-lane, E.C. [ADVT.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.
METCHIM & SON, 20, Parliament-st. S.W.
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MONUMENT CHAMBERS,
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PATENT ASPHALTE and FELT ROOFING.
ACID-RESISTING ASPHALTE.
WHITE SILICA PAVING
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CONTRACTORS TO H.M. GOVERNMENT FOR SLATES AND SLATE BATHS.
PERMANENT GREEN SLATES, AS USED ON THE LAW COURTS AND OTHER PUBLIC BUILDINGS.

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OF EVERY DESCRIPTION.

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MARBLE & ENAMELLED SLATE CHIMNEY-PIECES,

Marble and Enamelled Slate Lavatory Tops and Fittings complete, Slate Cisterns, Shelves, and Urinals.

Works—Aberllefenny, North Wales. Midland Wharf, Bow. Payne-road Wharf, Bow.
Head Office and only City Address, 61, ST. MARY AXE, E.C. Branch House, 37, Victoria-street, Bristol.
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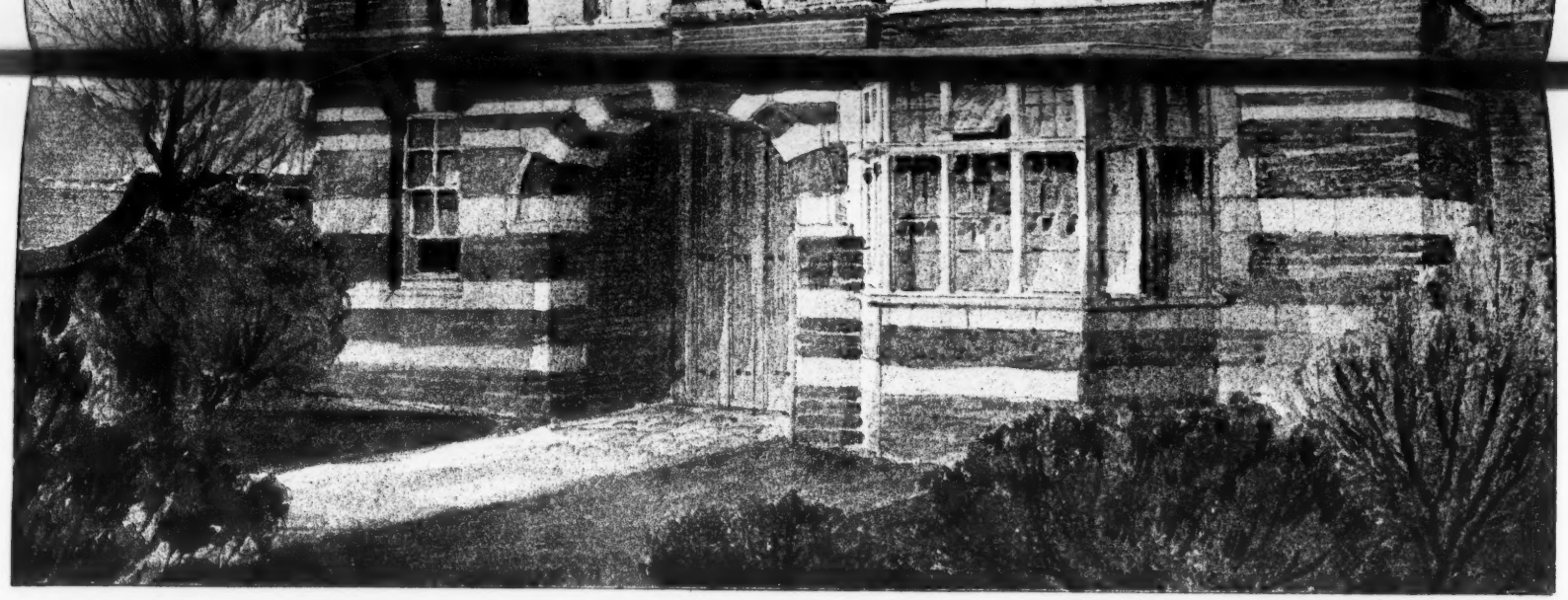
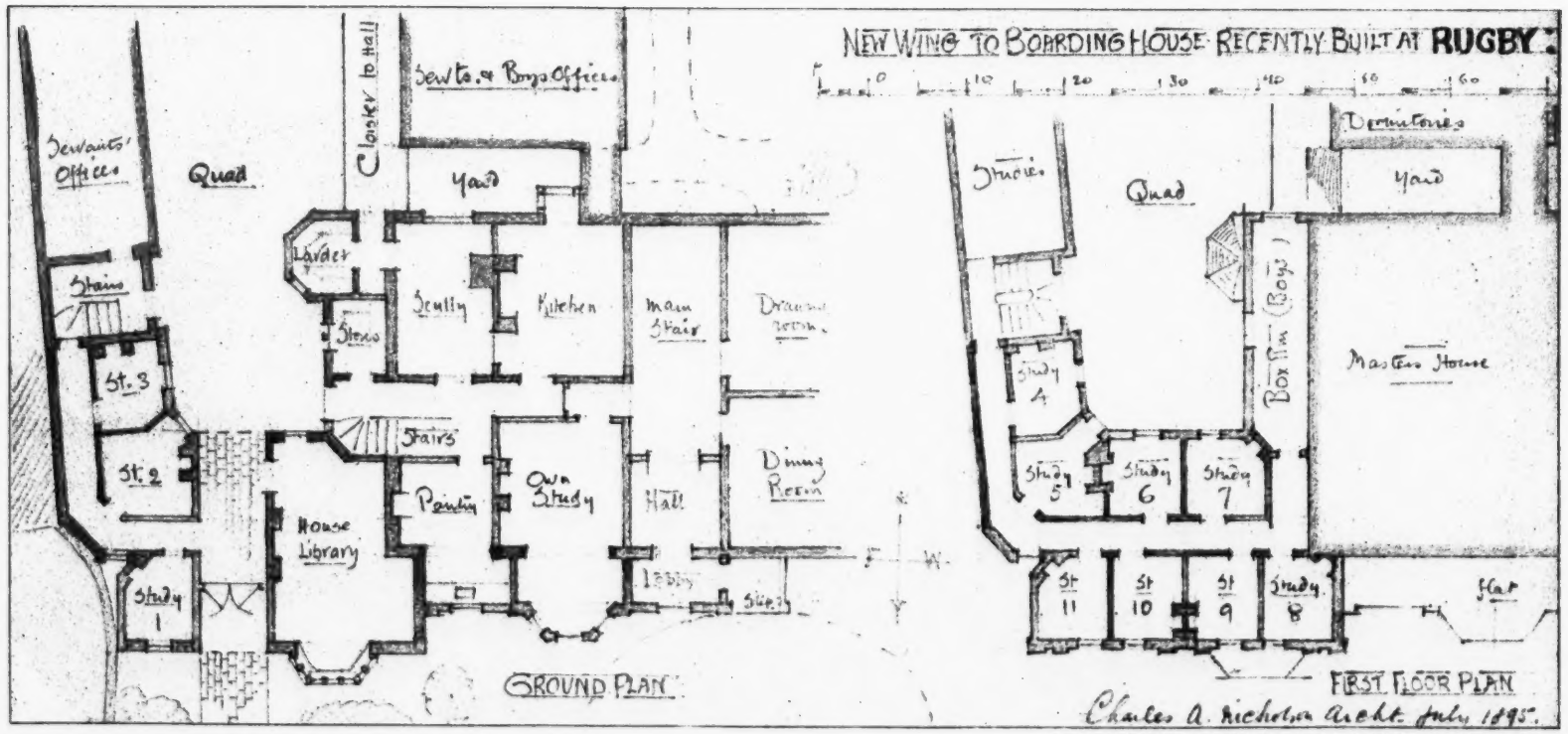
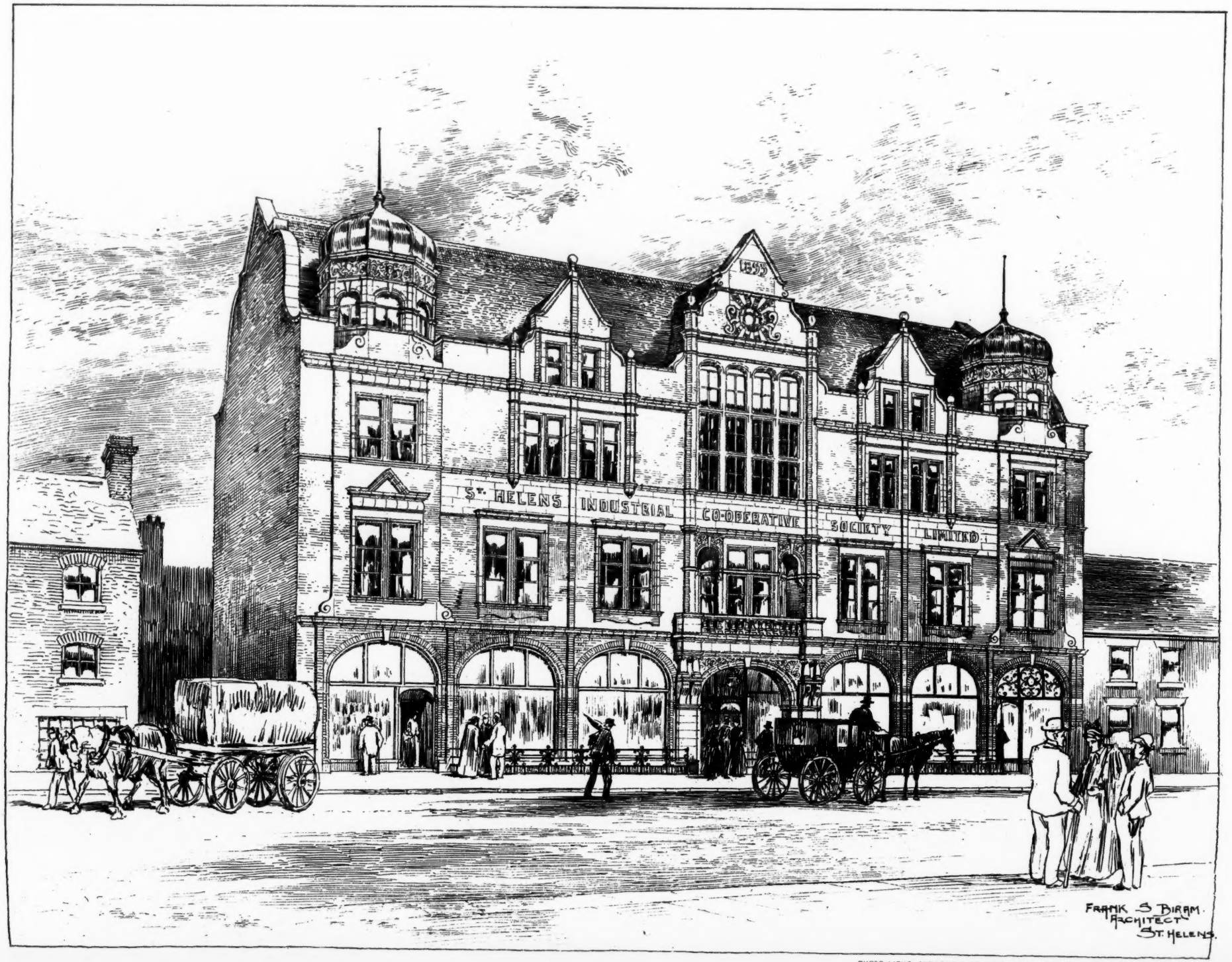



NEW WING TO BOARDING HOUSE RECENTLY BUILT AT RUGBY.
Clock to Hall
Sewts. & Boys Offices
Servants' Offices
Quad
Yard
Larder
Stairs
Scully
Kitchen
Main Stair
Drawing Room
Store
St. 3
St. 2
Stairs
Pantry
Own Study
Hall
Dining Room
House Library
Study 1
Lobby
Steps
GROUND PLAN
Studies
Quad
Dormitories
Yard
Box Rm. (Boys)
Master's House
Study 4
Study 5
Study 6
Study 7
St 11
St 10
St 9
Study 8
Flat
FIRST FLOOR PLAN
Charles A. Nicholson Archt. July 1895.



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NEW BUSINESS PREMISES, ST. HELENS — Mr. FRANK B. BIRAM, ARCHITECT.

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Carmelite Street, E.C.
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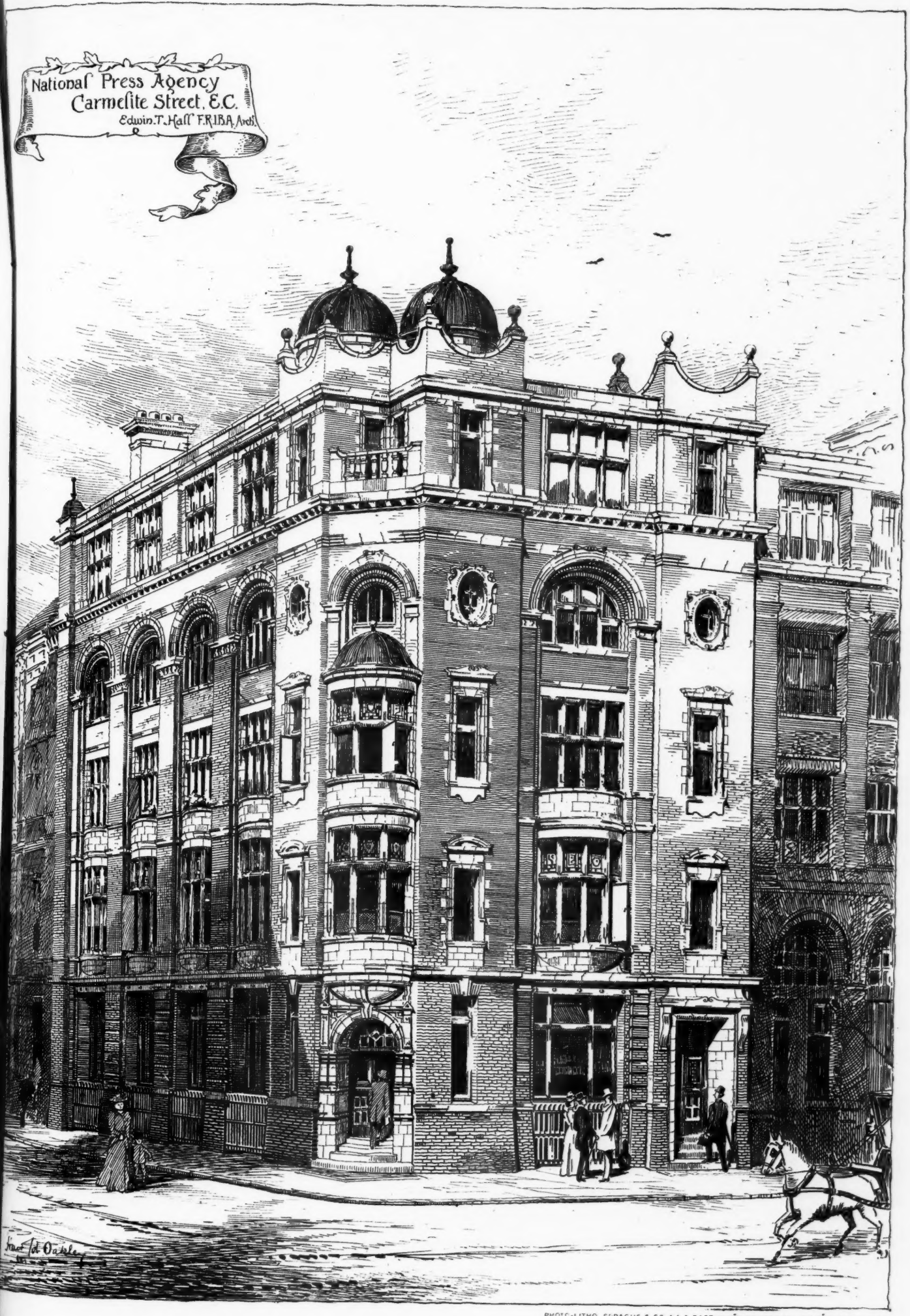

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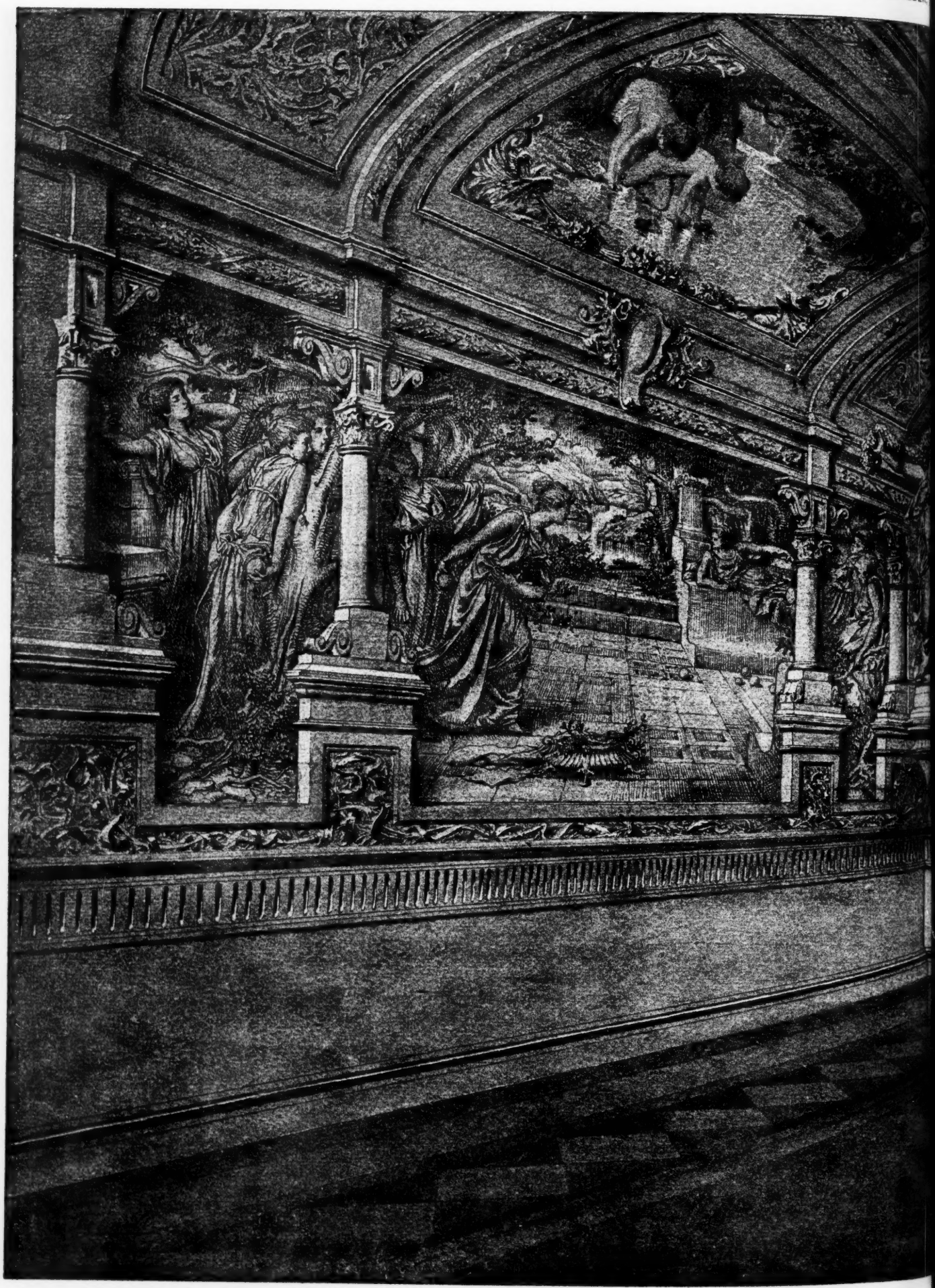
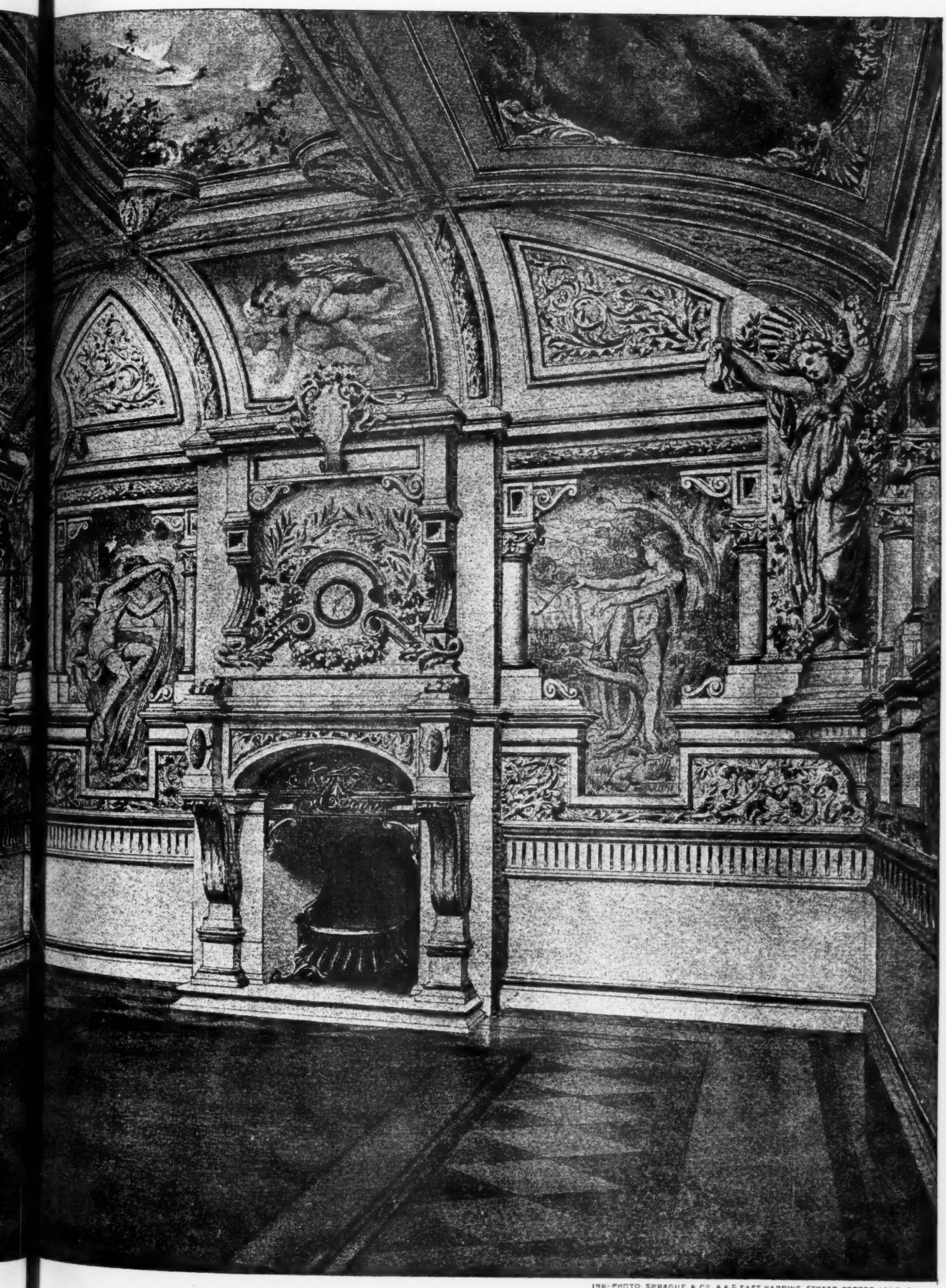


DESIGN FOR THE DECORATION IN GRA OF A



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GRA OF A ROOM.—By Mr. C. T. G. Formilli.

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